

# Chemical Week



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◀ ***Polypropylene textiles are growing up . p. 35***

More plastics for toys. Resin demand may hit 120 million lbs. this year . . . . . p. 42

Catalyst is key to pure aniline in novel process at Cyanamid Willow Island plant . . p. 68

Spain—Can its planned economic reforms attract U.S. chemical capital? . . . p. 99

Part One of Two Parts

September 26, 1959

Price 50 cents



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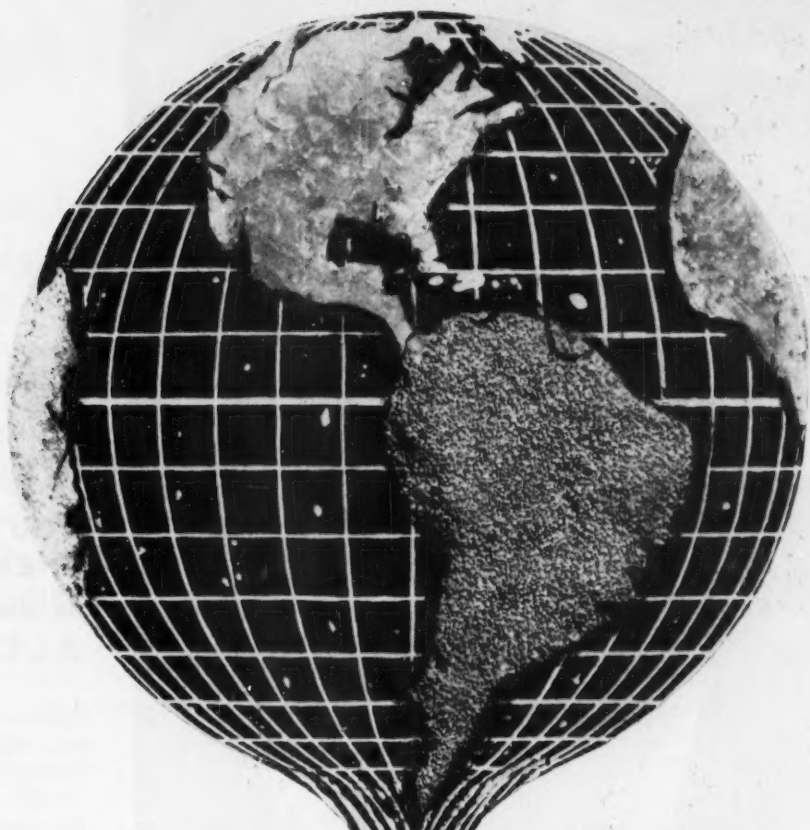
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## TOP OF THE WEEK

SEPTEMBER 26, 1959

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COVER PHOTO COURTESY CHEMSTRAND CORP.

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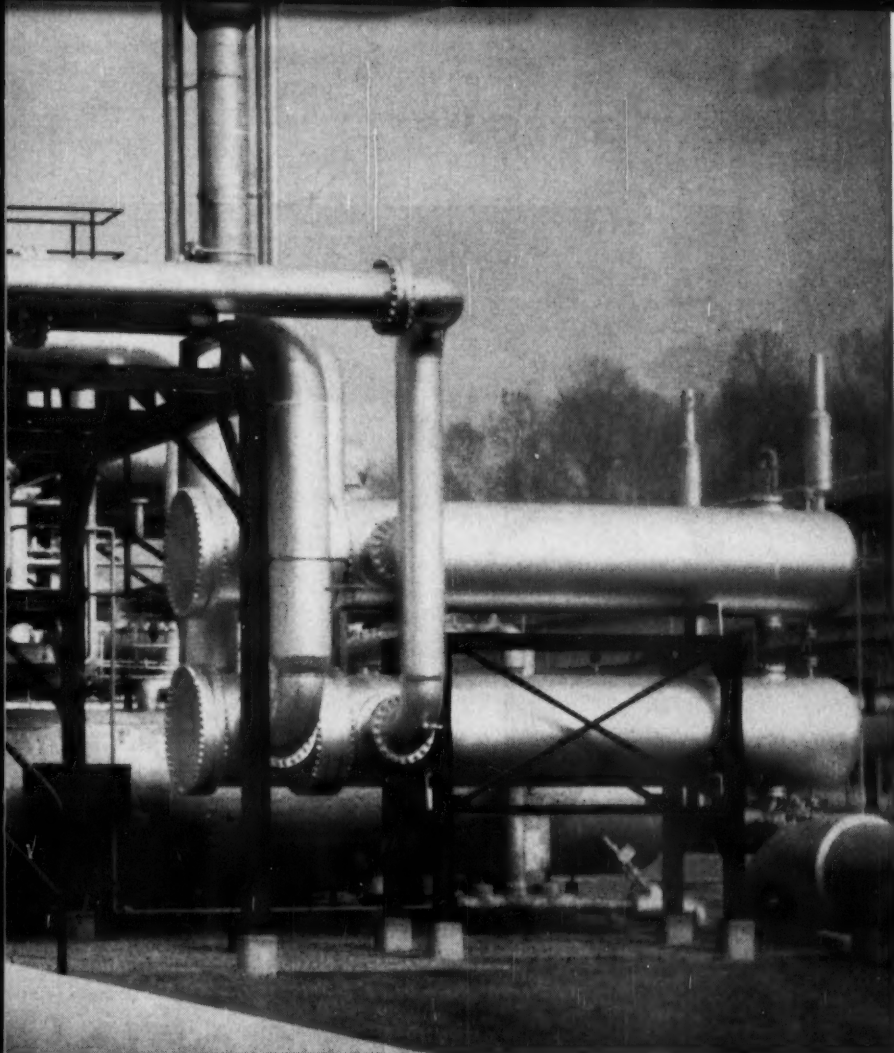
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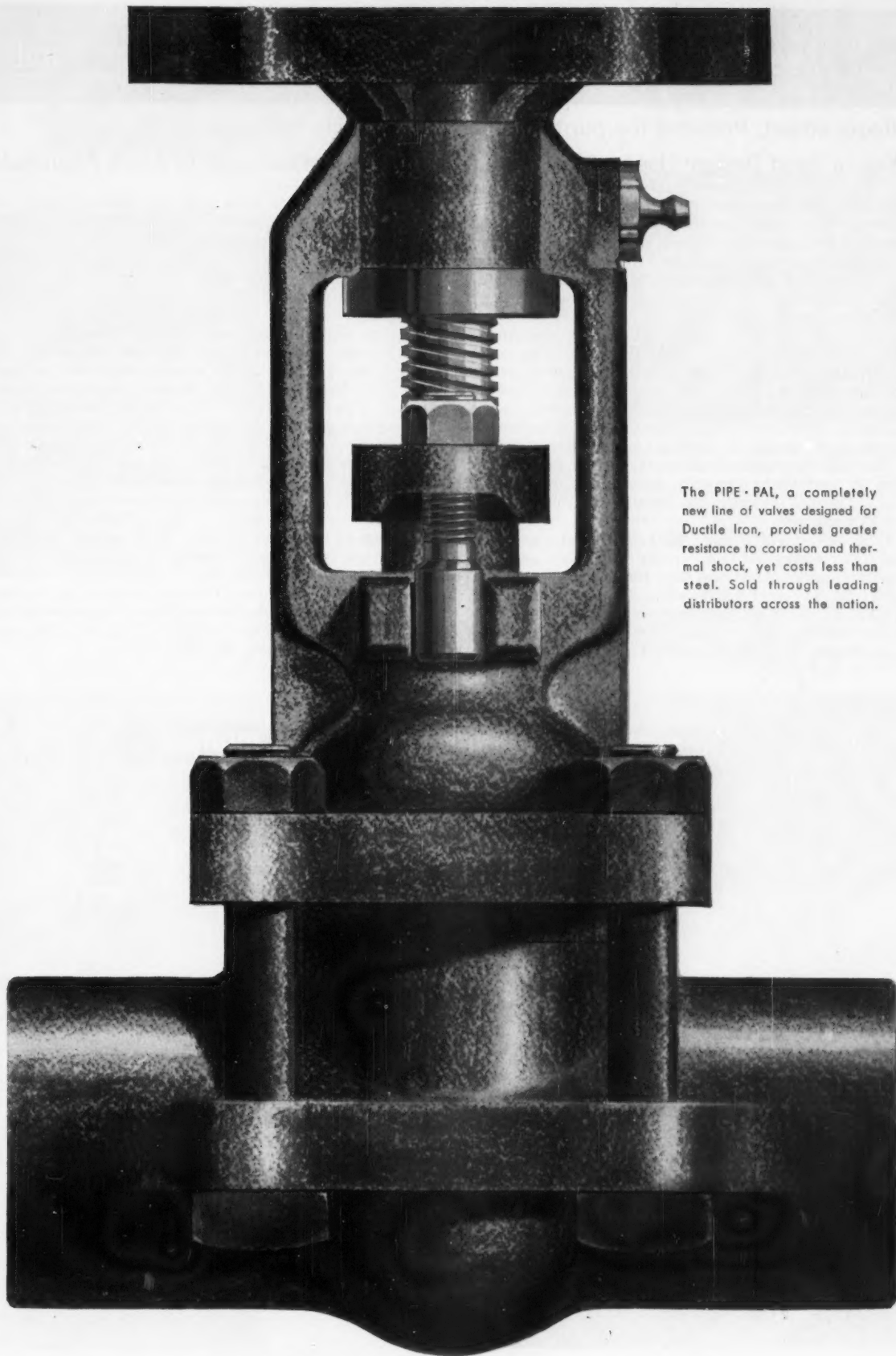


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## See why ALCOA ALUMINUM makes a good design habit

**Requirement:** Preserve the purity of chemical products in transport

**Key to Good Design:** Use tank cars, trailers and containers made of Alcoa Aluminum

Just as aluminum preserves the purity of chemical or petroleum products during processing, so it protects them on the way to the customer. Processors of ammonium nitrate, nitric acid and hydrogen peroxide depend on aluminum containers for moving their products because aluminum does not discolor, contaminate, or in any way alter the product as other metals can, and often do.

Tank cars, hopper cars, trucks and tanks made of ALCOA Aluminum resist corrosive attacks from a wide range of liquids and gases. Such containers are also nonsparking, for increased safety in transporting explosive or volatile products. For shipping hot ladings, ALCOA has developed aluminum alloy 5454 which combines high strength with metallurgical stability at elevated temperatures.

The flow chart below illustrates the acceptance of aluminum for transporting chemicals. Aluminum tanks and tank cars are used in the entire distribution system for nitrogen fertilizer solutions.

Other advantages of using this versatile metal for truck and trailer bodies and tanks are its light weight and high impact resistance. Aluminum tanks for highway vehicles are lighter than any other suitable metal. They offer real savings in a higher ratio of payload to gross weight, with less wear on the vehicles.

Aluminum's high impact strength is reflected in records

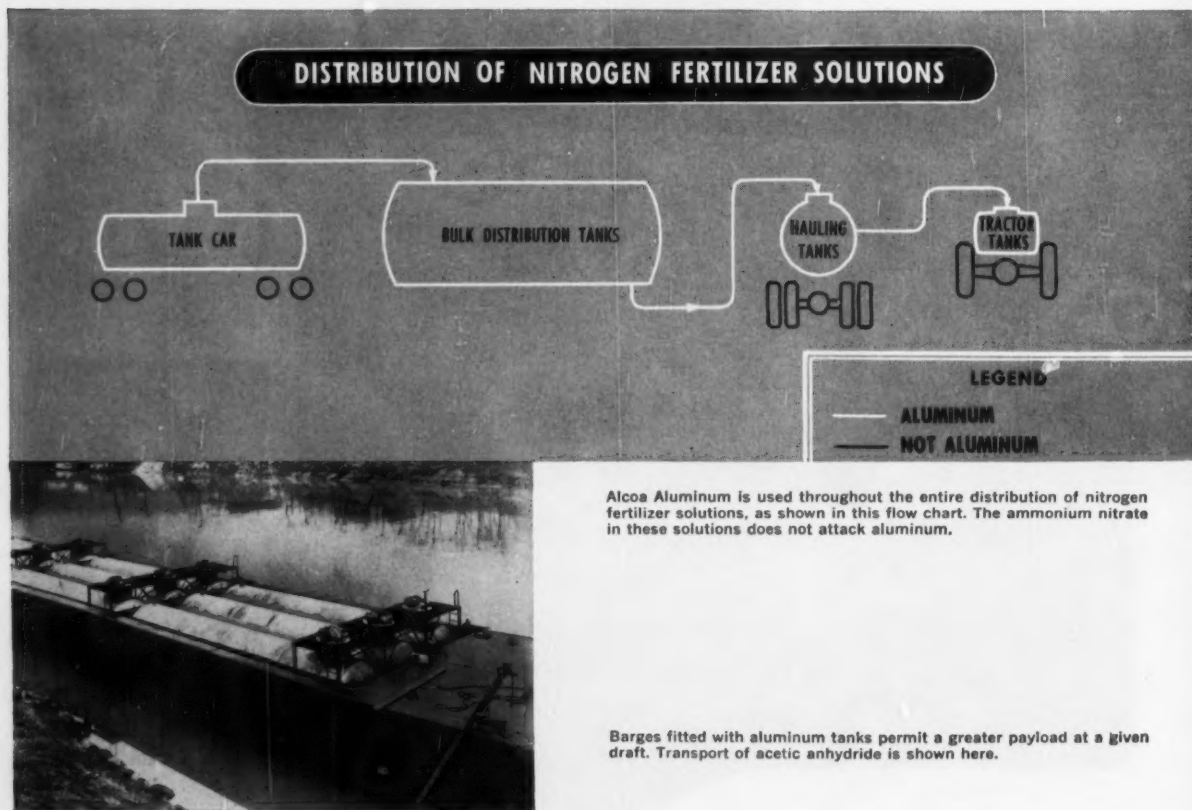
of highway accidents. These show that aluminum tanks and truck bodies have survived and returned to service where tanks made of other metals have failed.

Tank cars, trailers and containers are easy to fabricate with aluminum. Highly workable alloys available from ALCOA lend themselves to standard welding and brazing techniques.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years, and can help you specify the aluminum tank or container best suited for your product transport application. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address on the coupon, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

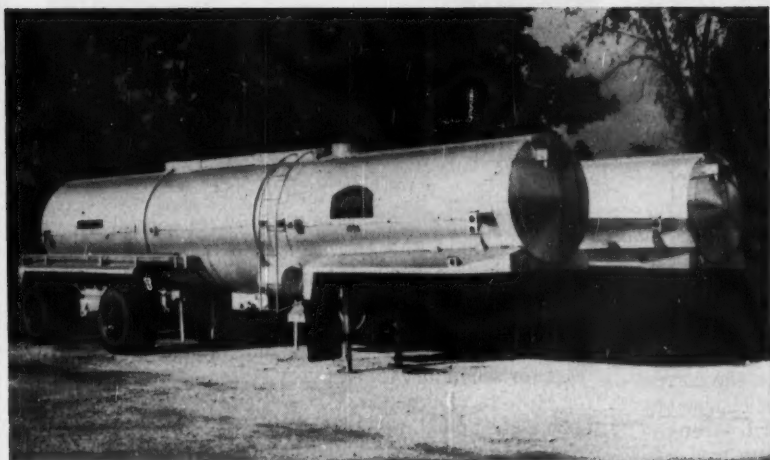
You can also take advantage of the wide selection of free ALCOA literature on aluminum for transportation products and other process applications. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward your material promptly and without obligation.

During 1959, ALCOA will conduct engineering conferences in a number of major cities on process industries applications of aluminum. Contact your nearest ALCOA sales office for full particulars and data.

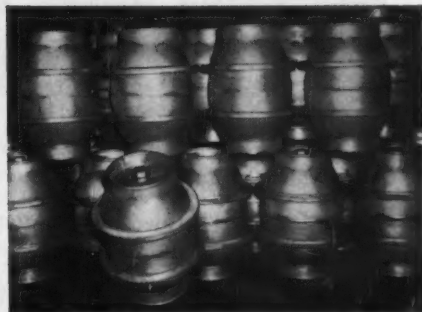




Aluminum hopper cars are widely used to transport sulfur and sulfur-bearing coal, and other solid products used in the processing industries.



Aluminum truck, trailer and tank bodies offer substantial savings in payload because of their light weight. Aluminum is specified because it will not contaminate such products as distilled water, hydrogen peroxide, formaldehyde, fatty acids and other chemicals. Maintenance costs are lower since aluminum requires no special protective coatings. The trailer illustrated is fabricated from Alcoa Aluminum Alloy 5454, and is used for handling hot asphalt, sulfur and other hot ladings.



Alcoa makes a wide variety of shipping containers for the processing industries. Conforming to ICC regulations, these containers range in size from 7½ to 110 gal, and are used for shipping such diverse products as beer and fuming nitric acid. Alcoa alclad beer barrels cost 30 per cent less, are 45 per cent lighter than barrels of competing metals, and give longer service life.

Alcoa research has developed special aluminum-magnesium alloys combining high strength with the compatibility of high-purity aluminum for peroxide service.



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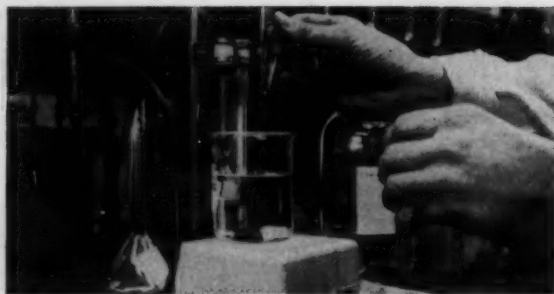
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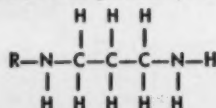
## A look at today... and a glimpse

### The Duomeens®

Armour's N-alkyl trimethylene diamines—trade-named Duomeens—are industrial or technical grade chemicals with many diverse applications.

The Duomeens contain both primary and secondary amine groupings. Being strong difunctional bases, they exhibit greater cationic activity than the corresponding primary amines. The adsorption characteristics of the Duomeens enable them to form strongly bonded organophilic or hydrophobic films on surfaces of metals, textiles, plastics, silica, minerals, celluloses, etc.

The Duomeens have this general structure:



"R" represents an alkyl group derived from a fatty acid; i.e., Duomeen C—Coconut; Duomeen S—Soya; Duomeen O—Oleic; and Duomeen T—tallow.

### Where the Duomeens work today

**Pigment dispersions.** Duomeen T dioleate—the oleic acid salt of Duomeen T—finds wide use by pigment and paint manufacturers. This cationic chemical has proved to be very effective for better pigment wetting, dispersing, flushing and coating.

**Some of its important advantages are:**

1. Higher grind-numbers with appreciable savings of grinding time and power consumption.
2. Elimination of pigment segregation.
3. Better gloss due to finer particle size and more uniform dispersion.
4. Anti-settling characteristics.
5. No effect on rate-of-drying.

Generally, 0.5% to 3% of Duomeen T dioleate (based on weight of dry pigment) is sufficient for effective dispersion. Naturally, concentrations depend on the materials used and the type of manufacturing process.

For complete data, check "A" in coupon.

**Water treatment.** The bactericidal effect of the Duomeens and their inherent ability to protect against corrosion makes them important chemicals for various industrial water treatment applications.

For example, the corrosion rate in a brine-water disposal system was reduced 98% by using Duomeen TDO-50.

In other systems, Duomeen CDA-50 has successfully controlled corrosion and bacteria in sea water used for secondary oil recovery systems. And in cooling towers, Duomeen CD-50 effectively combats both algae and slime.

More information? Check "B" in coupon.

**Epoxy resins.** The problems of thermal shock and mechanical vibration on delicate electronic equipment are being solved by new epoxy resins. One of the additives that makes these resins so effective is Duomeen S—an Armour cationic chemical that has few equals as a flexible hardener.



Several epoxy resin manufacturers report that the Duomeen helps eliminate normal internal stresses caused by the expansion and contraction during "potting," and also after the component parts are put into actual use.

In one instance, Duomeen S has been very effective in a system containing 69 parts (by weight of Duomeen S) to 100 parts of the epoxy resin.

Duomeen S is compatible with most of the manufacturers' own epoxy hardeners. And a wide range of properties—from very flexible to rigid—may be obtained by combining these hardeners with different amounts of the Duomeen.

Find out more. Check "C" in the coupon.

**Metal working.** 10% Duomeen TDO in 300-second oil has increased die life 80 to 100% in bench drawing of soft copper tubing. This lubricant combination also reduces breakers, makes for cooler and cleaner operations and eliminates chattering. Tubing has been drawn from both 85-15 and 90-10 (copper-zinc)





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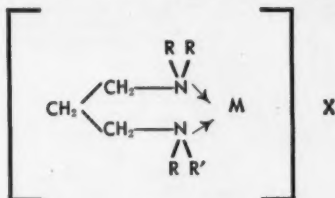
**Mineral beneficiation.** Duomeen T diacetate—known as Duomac® T—is being successfully used in the mineral flotation field. It selectively separates silica, mica and pyrite from calcite or kyanite. In addition, it separates silica from iron oxides, feldspar from silica and monazite from a variety of heavy minerals.

For more information, check "E" in coupon.

### Where Duomeens will work tomorrow

Armour is continuing to conduct tests on methods of clarifying industrial mineral treatment waters containing negatively-charged particles; e.g., clays and fine siliceous materials. In the completed work, the waters were treated with polyamine compounds (Duomeens) or their salts (Duomeen diacetate—Duomac T). These chemicals were used alone or in combination with inorganic coagulants such as aluminum sulfate. When used in combination, the chemicals have a synergistic action. Field results to date have been very encouraging.

Armour's Research and Development Lab has also investigated a new series of compounds of the following typical structure by reacting a long chain aliphatic trimethylene diamine and a bivalent metal:



M is a metal having 2 primary valences. X is an anionic group. R is either hydrogen or methyl. R' is a long chain aliphatic group.

Look to Armour for future information on these potential bactericidal and fungicidal compounds.

Check "F" in coupon for more data.

**You probably have an important use for at least one of the Duomeens. Find out. Send the coupon or call Armour today.**

## NEWS NOTES

**London, England.** The Armour Industrial Chemical Company, Ltd. and Hess Products, Ltd., have merged under the name Armour-Hess Chemicals, Ltd. R & D and customer service facilities of the two companies will be combined. The new company will service British industry and the United Kingdom export markets.

**Chicago.** The Ammonia Division of the Armour Industrial Chemical Company announces the development of a new, low cost process that will separate dissociated ammonia into its basic gaseous constituents—hydrogen and nitrogen. Working with another producer on this development, Armour Ammonia reports that the process will soon make it possible for processors to derive 96% pure H<sub>2</sub> economically for many varied applications, including hydrogenation.

**Portland, Oregon.** A new Western regional sales office has been opened here by the Armour Industrial Chemical Company. Mr. E. L. Rhoads has been appointed regional sales manager. In addition to servicing Oregon, Washington, Idaho and Nevada, he will work with Armour's sales agent, Paul W. Wood Company, in California and Arizona.

**St. Paul.** Decomposition due to microorganism contamination in a major hide tanning house here has been effectively controlled with only 21 pounds of Duomac C-50 in 2500 gallons of wash water.



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## PROTECTIVE LINING CORPORATION

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## Antifungal Patents

TO THE EDITOR: Your interesting article on the new antifungal drugs (*Aug. 29, p. 77*) contains a statement concerning the patent situation on griseofulvin that may be misleading.

Although manufacturing patents on griseofulvin are held by Glaxo Laboratories, patents on topical and systemic uses in humans are held by Imperial Chemical Industries (London). The most important patent issued so far is U.S. 2,900,304. ICI carried out early work on topical and systemic uses of griseofulvin and is now selling the material in the U.K. and other countries. ICI's product will be handled in the U.S. by Ayerst Laboratories.

J. R. MYLES  
Imperial Chemical Industries  
(New York), Ltd.  
New York

## Safety Solvent Standards

TO THE EDITOR: Your article "How Cheating Dealers Bid for Sales—" (*CW, Aug. 8, p. 84*) is interesting and, unhappily, too true.

I am particularly interested in the authority for your statement that "safety solvents" must necessarily have 70% of chlorinated content to qualify for this appellation.

As one who has pioneered the development of blended products in this category, such an arbitrary figure is outside my experience.

To attempt to place a percentage of content figure as the sole qualifying standard would be grossly misleading to the industrial public. It would defeat the very purpose of the term, which is to assure the user that the product, used as directed and within the scope of its design, is free from critical fire, explosion and toxicological hazard.

Your reporter certainly did not contact those who specialize in the production of "safety solvents," else his point never would have been made. It is true that too many chemical jobbers have sought to trade on technology and arts developed by specialists, and do some "bathtub" mixing on their own. This has undoubtedly worked to the customer's detriment and is a form of cheating that goes far beyond the mere yielding

of an unconscionable profit to the jobber. It induces a false sense of security in the minds of those who buy—with obvious implications of risks, both to plants and men, of those who use these "gyp" mixtures.

While I do not approve of the term itself (there being no such thing as a wholly safe solvent), it is widely used and, as such, must be accepted. No limitation of percentage can arbitrarily classify a solvent as "safety" or otherwise.

JOHN B. MOORE  
Safety Solvent Service  
Opa-Locka, Fla.

*CW thanks Reader Moore for his cogent reasons why no arbitrary standards for "safety solvents" can be established. For indeed, when such factors as the nature of the end-use, flash point, and evaporation rate are considered, a mixture with 30% chlorinated hydrocarbon content could be safe in some applications, while, in others, one with a 90% concentration could still be hazardous.*

*But CW, in checking with companies responsible for compounding and selling substantial quantities of these solvents in major chemical markets, found the 70% figure was the one that was cited as a rough "rule of thumb." The article indicated that unethical distributors were misrepresenting subgrade material as meeting these accepted standards for specific end-uses.—Ed.*

## 'Only Minor Stoppages'

TO THE EDITOR: Your "Viewpoint" editorial in the Aug. 22 issue (*p. 10*) indicates that on the government boron fuels contract cancellations the companies' out-of-pocket costs would be negligible since the government paid for development as well as for plant construction.

This may apply to other installations, but at Metal Hydrides, where we delivered over 1.7 million lbs. of sodium borohydride to the Olin Mathieson plant for conversion into high-energy fuel, corporate funds paid for the cost of process development and corporate funds paid for about one-fifth of the plant construction cost—which totaled \$6 million.

Your editorial comments are important and strike home, but since

A COMPREHENSIVE sourcebook for chemical industry materials, equipment and services is an essential tool of trade for most everyone—from the researcher and engineer to the purchasing agent, salesman and traffic manager. This week, as part two of the issue you are now reading, we provide an up-to-date source of such information—the new, 732-page **CHEMICAL WEEK BUYERS' GUIDE ISSUE**.

As you can imagine, putting out such an issue involves a lot of detail work—though exactly how much nobody knows for certain. But this year, we kept some running totals:

- The sheets of copy that were sent to the printer, placed on end, would exceed the height of the Chrysler Building, and would be only 80 ft. short of the top of the Empire State Building.

- The "galley proofs" which the printer sent back for proofreading, laid end to end, would be longer than the world's longest passenger liner, the *Queen Elizabeth*. They would just about match the combined lengths of the *Independence* and *Constitution*.

- The subject headings in the issue total 8,135 (an increase of approximately 2,000 in two years). The issue contains more than 170,000 listings.

- Estimated total weight of paper and ink used in printing the Sept. 26 issue: 200,260 lbs.

But while we're happy to report most statistics are going upward and onward, growth in one area has been deliberately held down—jobbers and agents listing themselves as manufacturers. Each year, on the basis of our own checking and through information from other sources, we refuse spurious listings. This year, we turned down 3,346 such listings from 76 different firms.

For members of our **BUYERS' GUIDE** Issue staff, it is already '61. As soon as the last page proofs were returned to the printer, preparations were begun on next year's edition—adding further product headings and redesigning our three separate check lists, revising the mailing lists.

All in all, we hope that our efforts have resulted in a **BUYERS' GUIDE** Issue that is useful to you. That, after all, is its reason for being.



# Labeling Lines



HERE ARE  
**6** STEPS  
TO BETTER  
LABELING

... SIMPLY EXPLAINED IN OUR  
COMPLIMENTARY BOOKLET!

Readers of this column during the past year or so have undoubtedly found the series of "Labeling Lines" helpful in one respect or another.

We've prepared a booklet which provides, in composite form, six of the past subjects. It's yours for the asking, and it includes tips on:

- 1 FOIL LABELS AND THEIR APPLICATION
- 2 FACTORS INFLUENCING SUCCESSFUL LABELING
- 3 LABELING ADHESIVES
- 4 DETERMINING THE SIZE AND SHAPE OF WRAP-AROUND NECK LABELS
- 5 PLANT LAYOUT AND BETTER BOTTLING
- 6 LABELING STANDARDS

WRITE FOR BOOKLET L - 100

World's Largest Manufacturer of High-Speed Labeling Machinery

**WORLD LABELERS**

ECONOMIC MACHINERY COMPANY • Worcester 3, Mass. / Div. of Geo. J. Meyer Manufacturing Co.

## OPINION

our earlier "uranium days" to the present "boron age," our company, as pioneer in hydride chemistry, has held the firm belief that the field of boron chemistry is just beginning to grow. Contract cancellations are only minor stoppages along the road to progress.

S. K. DERDERIAN  
General Manager  
Metal Hydrides Inc.  
Beverly, Mass.

## MEETINGS

American Institute of Chemical Engineers, national meeting, St. Paul Hotel, St. Paul, Minn., Sept. 27-30.

American Oil Chemists' Society, Statler Hilton Hotel, Los Angeles, Sept. 28-30.

Society of the Plastics Industry, New England Section conference, Portsmouth, N.H., Oct. 1-2.

National Assn. of Corrosion Engineers, Northeast regional meeting, Lord Baltimore Hotel, Baltimore, Md., Oct. 5-8.

Powder Metallurgy Parts Manufacturers Assn., Sheraton-Cadillac Hotel, Detroit, Oct. 6-7.

Stanford Research Institute, high-temperature symposium, Asilomar Hotel, Pacific Grove, Calif., Oct. 7-9.

American Vacuum Society, symposium on vacuum technology, Sheraton Hotel, Philadelphia, Oct. 7-9.

Technical Assn. of the Pulp and Paper Industry, fourth de-inking conference, Roger Smith Hotel, Holyoke, Mass., Oct. 8-9.

American Assn. of Textile Chemists and Colorists, national convention, Sheraton-Park and Shoreham Hotels, Washington, D.C., Oct. 8-10.

American Ceramic Society, Refractories Division meeting, Bedford Springs Hotel, Bedford, Pa., Oct. 8-10.

Technical Assn. of the Pulp and Paper Industry, fourteenth engineering conference, Penn-Sheraton Hotel, Pittsburgh, Oct. 11-15.

American Society for Testing Materials, spectroscopy symposium, San Francisco, Oct. 11-16.

American Society for Testing Materials, second forum on nuclear problems, Sheraton-Palace Hotel, San Francisco, Oct. 13.

Society of Plastics Engineers, two-day technical conference; subject: Plastics Engineering Today; Ambassador Hotel, Los Angeles, Oct. 13-14.

Parenteral Drug Assn., annual convention, Statler Hotel, New York, Oct. 14-16.



5000°F

4000°F

3000°F

2000°F

1000°F

500°F

# Heading for the unknown?

## Check your processing requirements against Norton Fused Zirconia

You can't predict tomorrow's processing requirements. However, you can be prepared to meet many of them more efficiently and economically . . . with Norton Lime-Stabilized Fused Zirconia.

### Consider Its Unusual Characteristics

Extremely high melting point (4,620°F) coupled with a lower thermal conductivity than standard dense refractories • Excellent resistance to thermal shock and abrasion • Not wet by most metals • Moderate electrical insulator at low temperatures and conductor above 2,200°F • Good stability in either oxidizing or reducing atmospheres.

### Consider Its Many Applications

As potential material for use in missiles and reaction motors • As a support for firing highly-reactive titanates • As lining for furnaces containing high temperature gaseous reactions • For furnace parts and linings used in the metals industry • As lining and packing media for high temperature air heaters and heat exchangers • For many other critical processes.

Chances are you can improve both your processing and your production economy with this rugged, versatile material. Let a Norton Sales Engineer help. He's well qualified to discuss your precise requirements. Write to NORTON COMPANY, Refractories Division, 908 New Bond Street, Worcester 6, Mass.

**Note:** Norton Lime-Free Fused Zirconia is also available for the manufacture of refractories, as a source material for zirconium for chemicals and metals, or as an opacifier for glazes and enamels.

Melting Point . . . . .	4,620°F
Maximum Usable Temperature . . . . .	4,450°F
Chemical Nature . . . . .	Stable
Electrical Resistivity . . . . .	High Temperature Conductor
True Specific Gravity . . . . .	5.6 — 5.7
Two Grain Types . . . . .	Hard Dense Grains Bubble-Type Grains

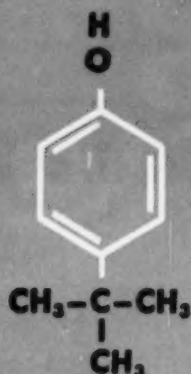
# NORTON

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Now in commercial production at Stepan's new Millsdale, Illinois plant (near Joliet) is p-tert-Butylphenol. This new Stepan product . . . one of a series of Stepan substituted phenols . . . can be supplied flaked or as a concentrated solution in caustic. Bulk shipments of the molten Butylphenol can also be made where required. There are a number of interesting commercial and potential uses for p-tert-Butylphenol, and we would be pleased to send you working samples for your evaluation.

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# *p-tert-Butylphenol*



#### VARNISHES

p-tert-Butylphenol-formaldehyde resins impart rapid drying properties to varnishes, along with improved hardness and durability.



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Like most phenolics, p-tert-Butylphenol possesses antioxidant activity that makes it valuable in preserving soap and other sensitive products.

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AMERICA'S MOST COMPLETE LINE OF SURFACTANTS

# Business Newsletter

CHEMICAL WEEK  
September 26, 1959

**The steel strike is starting to crimp CPI sales.** Last week, Pacific Northwest Alloys shut down the last of its four alloying furnaces—this one at Mead, Wash. The plant produces ferrochrome alloys for industry, about 95% of its output going to steel producers.

**But long-range CPI predictions have a bright hue—especially in fibers and plastics:**

- A 100% plastics production increase in the next 10 years is anticipated by Paul Mayfield, vice-president and director of Hercules Powder Co.—with the auto industry's consumption of plastics alone doubling to 200 million pounds by 1965. Also foreseen: plastics increasingly replacing steel, bronze, aluminum and glass in certain areas, with major gains predicted in packaging and other films, household appliances, and home construction. And the '60s will not only see polyethylene as the first billion-pound plastic, Mayfield said; by '65, polypropylene will be approaching the billion-pound production level.

- And a surge in the 15- to 25-year-old population group during the next decade will push synthetic fiber consumption over the 1 billion lbs./year mark. Andrew Buchanan, manager of Du Pont's Textile Fibers Division, says the company's capacity to produce synthetic fibers will approach 600 million lbs./year in the early '60s.

•  
**Major expansion plans are still hatching,** no matter how speculative the short-term sales outlook may be.

- Shell Chemical and American Cyanamid plan to produce polystyrene at Cyanamid's Wallingford, Conn., plant. Small-scale production will start late this year. If Shell's pilot plant results are confirmed, the company will build a full-scale plant. The arrangement will be a straight contract deal, not a joint venture. The Wallingford plant has been idle since February, when Cyanamid gave up production of its Cymac (methylstyrene) thermoplastics.

- Phillips Chemical is again expanding its Sweeny, Tex., ethylene plant. This 35 million lbs./year boost, together with the 75 million lbs. expansion slated to go onstream by Oct. 10, will bring Phillips' annual capacity to 290 million lbs. Target date: second quarter '60. The latest boost was expected (*CW*, July 4, p. 23), brings the Sweeny plant's capacity up to that of Phillips' Pasadena unit.

•  
**The nylon-rayon tussle for tire-cord markets** is getting even hotter. Last week, nylon boosters were cheered by a vote of confidence from Firestone, which revealed plans to make its own nylon (*see p. 22*). This week, Industrial Rayon slashed prices 4¢/lb. on its 1100 denier Tyrex viscose yarn, and 5¢/lb. for the 1650 denier. New tag: 62¢/lb. and 55¢/lb., respectively. Next question: Are nylon-cord prices due for

## **Business Newsletter**

(Continued)

another cut to retain the advantage of the 9-14¢/lb. cuts made last month?

### **Pollution problems are making news in Florida and New York.**

For Escambia Chemical Corp., they are reaching a crisis point. The company faces a possible shutdown order in its hassle with the Florida State Board of Health over alleged pollution of Pensacola's Escambia Bay. State Sanitary Engineer David Lee found Escambia's first clean-up proposal inadequate, has told his staff to prepare injunction proceedings. The proposed court order would forbid the pouring of ammonia spillages from fertilizer and nitric acid operations into an effluent ditch that empties into the bay.

Complicating the problem: Columbia-National Corp.'s adjacent zirconium-hafnium operation shares the ditch, also allegedly dumps ammonia compounds into the bay.

### **But solution of Buffalo's water pollution problem is in sight.**

After 20 years of debate and two hours of hard bargaining, the city and five industrial concerns with large plants on the Buffalo River have worked out details of the water supply plan that was approved in principle three and a half years ago (*CW Business Newsletter*, Feb. 4, '56).

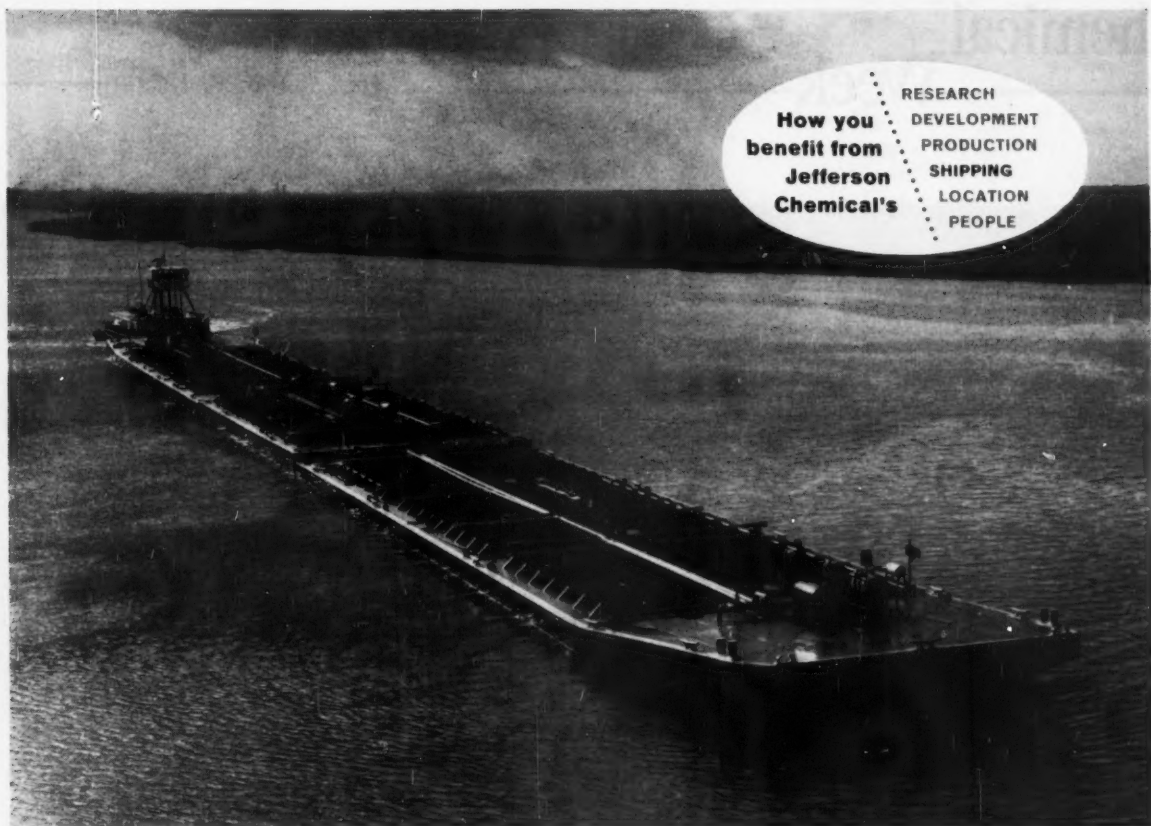
Principal points in the city's new contract with Allied Chemical's National Aniline and General Chemical Divisions, Socony Mobil, Donner Hanna and Republic Steel:

- The city will sell bonds to finance construction of a \$6-million pumping station and distribution system that will supply raw Lake Erie water to those plants for industrial cooling.
- The five companies will set up a new corporation to operate and maintain the plant and make payments to the city over the 30-year life of the bonds.
- The companies guarantee: (a) for 30 years they will buy all their raw-water requirements from the system; (b) for the first five years they will buy enough water to cover amortization costs.

The companies expect to use more than 100 million gal./day of water from the system, will discharge the water into the Buffalo River, increasing its flow and thereby reducing pollution. This plan, declares Mayor Frank Sedita, will not only bring the Buffalo River into compliance with state regulations, but also will permit considerable industrial expansion in the locality.

**Product liability claims are running on a plateau.** That's the gist of a new survey, just completed by the Drug, Chemical and Allied Trades Section of the New York Board of Trade. In the survey, DCAT found that 100 of its 180 firms were charged with product liability claims during the past five years. But about half of the firms polled say the frequency—and probably more important, the dollar volume—of these claims have been essentially the same throughout the five-year period.





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## **Jefferson pioneers special movement of chemicals by high-speed integrated tow... 5,000 tons per trip!**

Now in regular service between Jefferson Chemical's deep-channel Neches River docks and Mid-western ports on the Mississippi-Ohio River system is this express, integrated tow.

Jefferson is pioneering the movement of specification ethanolamines (mono-, di-, and tri-) by barge. Low-iron grade caustic soda, glycols, and a variety of other products will also move by these specially designed barges. This express tow will make a round trip in about half the time considered normal for chemical barges, which usually move in tramp tows.

Over 700 feet in length, the tow consists of three barges having a total capacity of 5,000 tons and butting together to form the equivalent of an unbroken integrated hull. Other features include double-skin construction — two bulkheads protecting each cargo compartment; external steel framing — leaving all compartments with a smooth internal surface for easier cleaning; completely separate cargo piping (essentially all stainless steel) and pumps for each product; multi-purpose baked

Epoxy resin linings where protection from iron pick-up is required; nickel, stainless steel, and resin-coated steamheating coils; dry gas purging and padding facilities for compartments carrying low-water specification materials; color-coded deck piping and equipment to assure proper hook-up for loading and discharge.

Equal care to see that Jefferson's products arrive with "plant purity" is taken in shipments by tanker, tank cars, tank wagons, and drums. In addition to direct-from-plant shipments, Jefferson maintains convenient stock points in all principal national markets. Let Jefferson's extensive experience in the proper storage, handling, and shipping of high purity chemicals work for you.



**JEFFERSON CHEMICAL  
COMPANY, INC.**

HOUSTON • NEW YORK • CHICAGO • CLEVELAND • CHARLOTTE • LOS ANGELES

September 26, 1959 • Chemical Week

21

NATIONAL ANILINE'S 60-MILLION LB./YEAR CAPROLACTAM PLANT IS LOCATED, HANDILY, RIGHT AT HOPEWELL.

BUT DDU PPONT MAY STILL BE IN THE RUNNING. ITS ABUILDING 50 MILLION LBS./YEAR MONOMER PLANT WON'T BE READY UNTIL LATE '60, AND IT IS ALL THE WAY DOWN BUT DDU PPONT'S CLAIMED PRICE ADVANTAGE IS OUTW

SPECIAL TO CW: SEPT. 15: WASH.--AT ITS BOARD MEETING HERE TODAY, FIRESTONE TIRE & RUBBER CO. REVEALED PLANS FOR GOING INTO PRODUCTION OF NYLON AND POLYPROPYLENE. TIRE CORD AND NEW SYNTHETIC RUBBER TECHNOLOGY, RESPECTIVELY, STAND BEHIND THE DECISIONS REVEALED HERE TODAY. ALTHOUGH THE COMPANY IS NOT SAYING MUCH ABOUT THE POLYPROPYLENE PROJECT, IT DOES REPORT THAT IT WILL USE A PROCESS IT DEVELOPED THE NYLON ASPECT OF THE DEAL IS STRONG NEW EVIDENCE OF TIEMAKERS' SWING TO SAME. NYLON-CORD TIRES SURE TO BE ON FUTURE NEW CARS. 'TIL NOW, NYLON CORD PRETTY MUCH LIMITED TO REPLACEMENT-TIRE MARKET.

BROOBT FOR NYLON... VENTURE WILL TAKE FIRESTONE THE FIRST U.S.S. RUBBER COMPANY TO PRODUCE ITS OWN NYLON FOR TIRE CORD. DESPITE THE FACT THAT IT MEANS A NEW PRODUCER ON THE SCENE, FIRESTONE'S MOVE IS ENCOURAGING

ENCOURAGING NEWS TO THE NYLON INDUSTRY IN GENERAL AND ALLIED IN PARTICULAR.

FOR IT TAKES PLACE AGAINST TWO BATTLES WHICH HAVE BEEN TAUGHT WITH

## New Force Figures into Nylon,

The board of directors of the Firestone Tire & Rubber Co. left its Washington, D.C., meeting last week with a chemical surprise in its collective briefcase: Firestone is entering nylon and polypropylene production. Here are its plans.

To provide production facilities, the directors approved the purchase of Celanese Corp.'s idle 250-acre

plant site and buildings at Hopewell, Va. Modernization and refitting of the fiber finishing and dyeing plant (Celanese moved the operations to Charlotte, N.C., a few years ago) will get under way within two months. Nylon filament production is slated to start late next summer. Polypropylene production is slated to start six months to a year later.

The company is reticent about details of its polypropylene plans. It says this process (like the nylon process) is its own, an outgrowth of Firestone's work with the lithium-based catalyst developed for its Coral "natural-synthetic" rubber. Patents on both the nylon and polypropylene processes have been applied for. Firestone piloted both at the Pottstown

### New Nylon Lineup

Producer	Capacity (million pounds/year)	Product
Allied	20	Nylon-6 textile, tire yarns, etc.
American Enka	6.5	Nylon-6 filament, yarn, staple
Chemstrand	120-125	Nylon-66 textile, tire yarns, etc.
Du Pont	275	Nylon-66 textile, tire yarns, etc.
Industrial Rayon	10	Nylon-6 yarns, staple, tow
Firestone	12	Nylon-6 yarn, tire cord

### New Polypropylene Lineup

Producer	Capacity (million pounds/year)	Status
AviSun	20 initially	Onstream Aug. '59
Dow	Not revealed	Onstream '61
Hercules Pow	20, to be expanded to 50	Onstream Dec. '57
Humble Oil	40	Completion due early '60
Montecatini	11 initially	Construction starts later this year
Texas Eastman	Not revealed	Pilot plant
Firestone	Not revealed	Production date not scheduled

## Propylene Balance

laboratory of its subsidiary, Firestone Plastics Co.

Most of the polypropylene output will be extruded into textile filament for furniture upholstery and similar uses. Some will also be made into industrial-grade film—much of it for use by Firestone as "camel backs" (strip-off backing for rubber shipped to tire retreaders). Firestone doesn't

say whether it has film suitable for packaging.

**Process Tally:** Other "synthetic natural" producers are more hesitant about applying their catalyst know-how to polypropylene. Goodyear, for example, declares it is "very much aware" of the polypropylene possibilities, but says its work is strictly in the research area. Goodyear's syn-

thetic natural, Natsyn, is still in the pilot-plant stage, incidentally.

Shell also has been working with polypropylene, but won't discuss plans.

Firestone won't reveal polypropylene capacity or production figures. The trade guess is that initial production will be small—and high-purity propylene will be trucked in from a nearby refiner—e.g., Sun Oil or Sinclair, at Marcus Hook, Pa.

**Score on Nylon:** In its initial stage, at least, the new unit will be rated at 12 million lbs./year of nylon-6—15% of Firestone's total (nylon and rayon) tire-cord needs (roughly 80 million lbs./year). Eventually, the company expects to step up production and market some of the nylon. But marketing is at least two years away, since the plant will, in the first year, turn out only about one-half of the nylon Firestone is already using.

A final agreement on who will supply the raw material—caprolactam—has not been signed yet. Most likely prospect: Allied's National Aniline Division, which has been supplying the monomer for development work at Firestone's Pottstown, Pa., lab; its contract runs through next year. National Aniline's 60-million-lbs./year caprolactam plant is also located at Hopewell.

But Du Pont may still be in the running as a raw-material supplier. Du Pont's 50-million-lbs./year monomer plant won't be ready until late '60, and it is at Beaumont, Tex.—but Du Pont's claimed price advantage could outweigh these drawbacks.

**Boost for Nylon:** The Hopewell venture will make Firestone the first U.S. rubber company to produce its own nylon for tire cord. Despite its promise of new competition, Firestone's move is encouraging news to the nylon industry, in general, and Allied, in particular. Its impact will be felt in the rough-and-tumble fight between rayon and nylon tire-cord producers; and the competition between nylon-66 (produced by Du Pont and Chemstrand) and nylon-6 (of which Allied is the only tire-cord producer).

Firestone emphasizes that its move



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**Score on Nylon:** In its initial stage, at least, the new unit will be rated at 12 million lbs./year of nylon-6—15% of Firestone's total (nylon and rayon) tire-cord needs (roughly 80 million lbs./year). Eventually, the company expects to step up production and market some of the nylon. But marketing is at least two years away, since the plant will, in the first year, turn out only about one-half of the nylon Firestone is already using.

A final agreement on who will supply the raw material—caprolactam—has not been signed yet. Most likely prospect: Allied's National Aniline Division, which has been supplying the monomer for development work at Firestone's Pottstown, Pa., lab; its contract runs through next year. National Aniline's 60-million-lbs./year caprolactam plant is also located at Hopewell.

But Du Pont may still be in the running as a raw-material supplier. Du Pont's 50-million-lbs./year monomer plant won't be ready until late '60, and it is at Beaumont, Tex.—but Du Pont's claimed price advantage could outweigh these drawbacks.

**Boost for Nylon:** The Hopewell venture will make Firestone the first U.S. rubber company to produce its own nylon for tire cord. Despite its promise of new competition, Firestone's move is encouraging news to the nylon industry, in general, and Allied, in particular. Its impact will be felt in the rough-and-tumble fight between rayon and nylon tire-cord producers; and the competition between nylon-66 (produced by Du Pont and Chemstrand) and nylon-6 (of which Allied is the only tire-cord producer).

Firestone emphasizes that its move

into nylon production does not signal a revolutionary decision to abandon rayon entirely, or to switch exclusively to nylon-6. It is simply part of Firestone's policy of supplying its own materials, the company says.

**On the March:** But Firestone and the other big tire producers agree that nylon's steady inroads on rayon tire-cord markets will continue. The advance has been slow, but steady. In '53, nylon tire-cord consumption was less than 5% of that of rayon; this year, it accounts for about one-third of the total cord market. The tire industry is consuming rayon and nylon at the rate of 320 million lbs. and 120 million lbs., respectively.

Many truck and most off-the-road tires are now made of nylon. But in passenger car tires, nylon's gain has been limited to the replacement market; virtually all original equipment car tires are still made of rayon (or Tyrex, as the rayon industry prefers to designate its improved rayon cord).

The trend was highlighted last week by Mohawk Rubber's switch of its entire passenger car production to nylon cord. Move was brought about, the company told *CW*, by "overwhelming consumer preference for nylon," as well as a desire to reduce production costs by using only one type of cord. But Mohawk makes only replacement passenger car tires. And it will continue using rayon for some of its truck tires.

**Obstacles, Still:** Probably the main obstacle standing between the nylon producers and the new-car market is the tendency of nylon tires to develop flat spots after standing. Individual tire purchasers are not seriously troubled by this, but car dealers find it a drawback when taking a prospective customer out for a spin. The problem apparently won't be directly solved, one tire research man told *CW*, because taking the "flat-spotting" quality out of nylon also takes out some of the fiber's good qualities.

But the nylon producers may solve the problem by stepping around it. And it is price, they believe, that will ultimately swing the balance in their favor. Last month, Du Pont cut nylon cord price to \$1.06/lb., matching Allied's nylon price. Although it's still higher on a per-pound basis than the 66¢/lb. tag on Tyrex,

Du Pont claims the difference in strength between the two fibers makes nylon ultimately cheaper.

Still, the consensus among major tire makers is that nylon will have to wait beyond '60—and the '61 car models—before it can break into the new-car field.

**Nod to "6":** For Allied, Firestone's decision to make nylon-6 is bound to bolster its stand against Du Pont and Chemstrand. They have claimed superiority for their nylon, on the grounds of greater strength and a higher melting point. On the other hand, a Goodrich official told *CW* that, while the cost of using nylon-6 is about 3% more than for using nylon-66, it has a 10% longer wearing life.

Of course, technical considerations are not the whole story. Du Pont has exclusive patent rights to nylon-66 (it licenses Chemstrand); the route to nylon-6 is clearer, and it is produced by a number of companies.

**New Contestants:** The battle for tire-cord markets may not remain primarily a contest between nylon and rayon. Other fibers are already slipping onto the scene.

Air Reduction Co. has been evaluating for two years its polyvinyl alcohol fiber with help of rubber companies. PVA cord tires are already being marketed in Japan (*CW*, Aug. 8, p. 63). Air Reduction's 20-million-lbs./year resin plant is due onstream in a few months, and the company is making engineering studies for a possible fiber plant.

And Firestone recently announced it was fleet-testing tires made with Du Pont's Dacron polyester fiber; also, that it has been working with Terylene, ICI's polyester. It "remains to be seen," Firestone tells *CW*, whether it will eventually produce a polyester cord at the new Hopewell plant. (Goodyear is also working with a polyester fiber—its Vitel—for tire cord.)

In any event, polypropylene and nylon are just the first of several resins Firestone hopes to produce at the plant. As a sign of its intention to step deeper into plastics, Firestone is absorbing its Pottstown-based subsidiary, Firestone Plastics Co. This will become the Plastics and Synthetic Fibers Division, headed by Roger Firestone, and will include the Hopewell operation.

## CPI Unions—

**Total lack of progress on merger of AFL-CIO's two chemical unions—Oil, Chemical & Atomic Workers (OCAW) and International Chemical Workers Union (ICWU)—marked the "Big Labor" San Francisco meeting last week. Wrapped up in side issues, and in strengthening over-all union power, the two had little time for effective merger action.**

Onstage, the federation moved to overcome effects of a legislative defeat over labor reform, clear away a bargaining stalemate for their United Steel Workers affiliate, and vitalize a dead-end organizing situation. AFL-CIO President George Meany called for "closing ranks against the enemy."

Meanwhile, backstage, union officials bickered over jurisdiction, although they tried to keep this from public view. And they did make some headway in overcoming their differences.

OCAW and ICWU were both in the middle of the maneuvers, though not with—or exactly against—each other. One result: They made no new efforts to resurrect merger discussions, agreeing there was no point to them.

Instead, they concentrated on their own difficulties within the federation. While A. O. "Jack" Knight, OCAW president, found his battle with the AFL-CIO's Metal Trades Division getting hotter, his counterpart, Walter Mitchell, head of ICWU, found his way being eased.

Knight was embroiled over "organizing rights." Mitchell was making headway for his union in the same area.

**Preconvention Flare-up:** OCAW's trouble with the metal trades flared up even before the convention—when the craft department, in its own meetings, singled out the Knight union for "raiding" the craft territory. It accused OCAW of "teaming up with the steel workers against the metal trades."

The fight centered on OCAW's demand that the craft unions organize separately and not as a department. The issue was on the convention agenda, and Knight said he would "fight it out." He added: "The trouble is getting worse all the time."

Rankled feelings prevailed on both sides, with no solutions in prospect.

## Still Separate

The two groups cited case after case where each accused the other of moving outside his proper jurisdiction.

While OCAW officials and craft unions debated possible solutions of their wrangle over jurisdiction, Mitchell's ICWU seemed to make a gain toward greater voice in the group.

This came when Mitchell introduced a resolution to change the voting ratio per number of members. That would require a change in the constitution. Mitchell's union—consistently out-voted in the old system—pushed the resolution, went to the executive committee for action. Two years ago, it couldn't even get this far.

And other Mitchell resolutions, on safety and compensation in atomic radiation, went through unanimously. Also offered by Mitchell: resolutions for the AFL-CIO convention floor, including a proposal for setting up an AFL-CIO training institute.

An OCAW official noted that his union was so taken up in the craft union battle that no resolutions were offered. And then the two unions made a point of going their separate ways.

## Fair Profit Picture

A clear picture of the CPI's post-recession pickup, just before it entered the summer doldrums, emerges this week from the second-quarter financial report just issued by the Securities & Exchange and Federal Trade commissions.

It shows sales and profits up sharply for all segments of the CPI except pharmaceuticals and petroleum refining.

In first- and second-quarter comparisons all manufacturing corporations had a 9.5% sales gain, while chemical and allied products scored a 12% advance. First-half comparisons show full magnitude of the gains: the total chemical improvement in first-half '59 over '58 was a sizable 20%.

The longest second-quarter sales leap was taken by stone, clay and glass producers. Swept along on the seasonal construction rise, the industry's sales shot up 29% over the first quarter. Other scores: nonferrous

metals, up 10.9%; paper and allied products, up 9.5%; industrial chemicals, up 9.2%; rubber, up 17.2%.

Petroleum refiners' April-May-June sales showed a seasonal drop of 6.2%. Seasonal factors also explain the slight slip in pharmaceutical sales, from \$894 million to \$893 million.

But more than seasonal factors account for the 4.3% drop in drug profits. Although the first six months were good ones for the drug industry (sales up 10.7%, profits up 14.3% over first-half '58), severe price competition took its toll.

For most of the CPI, however, the quarter's profit picture is even brighter than the sales rise. The breakdown for the rest of the CPI: all manufacturing, up 27%; chemicals and allied products, up 22.9% (six-month profits are up a whopping 82%); industrial chemicals, up 20.7%; petroleum refining, down 4%; rubber, up 34.2%.

## New Steroid Team

**A cooperative research agreement that will unite steroid know-how with a strong position in the U.S. drug market has been signed by Eli Lilly and The Syntex Corp.**

Lilly will share the expense of Syntex research and will make clinical tests in its own labs of promising compounds that may result. Both companies will then be able to market the products after they are proved.

For Lilly—one of the few big drug companies without a steroid on the market—the tie-up will leap-frog it into the hectic steroid race. Syntex was an early runner in the field, has already developed a broad line of steroids and hormones, which it has been selling in bulk to other pharmaceutical companies through its Mexican and Puerto Rican units.

And the deal will give a big lift to Syntex's campaign to break into the ethical drug market. It has already launched a new program that will bring it into the consumer market in Mexico this fall with several compounds, including progestational and anti-abortion hormones (*CW*, July 25, p. 34).

The U.S. market has been a more distant goal. Clinical testing in Lilly's labs should bring it closer by overcoming the hurdle of high U.S. drug standards. And Lilly's financial aid will free Syntex funds for production.

## Dow Network Grows

**Dow Chemical Co. has scheduled another large overseas facility—Plastichimie, S.A.—a polystyrene and saran plant to be built near Paris at Ribecourt, France.**

This latest move in a growing foreign network (Dow now has seven European subsidiaries and affiliated companies) is a 50-50 venture with Pechiney.

The plant is described by C. B. Branch, president of Dow Chemical International Ltd. S.A., as "very large for Europe, but not as large as Dow's main U.S. polystyrene facilities." Costs and actual planned capacity, however, were not revealed.

Bulk of raw materials will be obtained from the "Common Market" area, but Pechiney, which has its own polystyrene production units near Paris, will supply substantial amounts of styrene monomer and vinylidene chloride, as well as personnel, Branch said. Dow is making available its technology and capital.

Branch added that more Styron (Dow's polystyrene) than saran (Dow's vinylidene chloride copolymer) will be produced; and that 50% of the saran would be extruded fiber.

This is Dow's first associate plastics venture in the Common Market area. The plant is expected to come onstream in '61.

## Site for Cyanamid

**After a year-long search, American Cyanamid has found a new home. To draw together administrative operations now scattered in eight buildings throughout New York City, Cyanamid will build an \$8-10-million center on a 180-acre tract in Wayne Township, Passaic County, N.J. The site is within commuting range of New York.**

The campus-style headquarters will be built in units over a number of years, may eventually house 1,500 employees. Construction of the first—a computer center—will start this fall. The center will eventually house all the divisions except the fiber division, and possibly one or two others. No manufacturing units will be included.

In June, Cyanamid canceled plans to build the center in Alpine, N.J., when the community voted against making the necessary changes in its zoning laws.



## Antibiotic Suit: Act 2

**Bitter legal wrangling** marked the reopening last week of the Federal Trade Commission's antitrust suit against five antibiotics producers—a fight on basic patent monopoly issues that may wind up in the Supreme Court (*CW*, Aug. 9, '58, p. 21).

FTC charges that the five producers—American Cyanamid, Bristol-Myers, Olin Mathieson, Pfizer, Upjohn—resolved years of intercompany battling over patent rights on broad-spectrum antibiotics production by getting together behind Pfizer's patent on tetracycline. Their aim was to keep other producers out of the market and keep prices high, FTC claims.

To achieve this, FTC asserts, Pfizer falsified information in getting its tetracycline patent—which allegedly is not valid—and the other firms joined in the deception.

Pfizer is leading off the suit's defense. Last week's testimony revealed that the Patent Office had been ready to reject Pfizer's application in '54 on the grounds that tetracycline had

always been inherently produced along with Lederle's Aureomycin, which was discovered in 1947-48. The Patent Office suggested that Pfizer could try to disprove this by preparing fermentation broths and subjecting them to recovery procedures. Pfizer did, and submitted affidavits stating that there was no recoverable tetracycline.

FTC lawyer Daniel Hanscom unleashed a vigorous cross-examination concerning the affidavits, which are crucial in the charge of falsification.

## Research Forum

**A number of gains in plastics, pharmaceutical and chemical research were unveiled last week for the 9,000 chemists and chemical engineers who convened in Atlantic City for the American Chemical Society's 136th national meeting.**

Pennsalt chemists Joseph Simkin and B. Peter Block revealed a new polymer that could be the forerunner of a whole family of commercially useful carbon-free polymers. It's a polymeric monoaminedichlorozinc, and has limited elastomeric properties.

Another plastics entrant was introduced by Robert Cox, research chemist of the Bjorksten Research Laboratories, for Industry Inc. (Madison, Wis.). It's a phenolic—cheaper than currently available phenolics—made by substituting sucrose for some of the phenol used in the normal reaction for making phenolformaldehyde resins.

**Drug News:** Between their walks along the wind-swept boardwalk, the ACS members also got a sample of some of the new ideas pouring out of pharmaceutical research labs.

Agricultural Biological Corp. (Lynbrook, N.Y.) reported it was considering "mass production" of Elastase, an enzyme that may help control hardening of the arteries. And Lakeside Laboratories (Milwaukee) reported that pentolinium dibromide combined with hydrazine can produce a 39% decrease in blood pressure for as long as five hours in animal tests. Clinical tests are under way.

Eli Lilly bowed in with an exotic new antibiotic called Tylosin. It is said to be useful against a wide variety of animal and plant diseases.

## COMPANIES

**Ronson Corp.** (Woodbridge, N.J.) is increasing its interest in rare-earth metals through its wholly owned subsidiary, New Process Metals. The latter will be called Ronson Metals Corp., comprising two divisions: one for production of rare-earth and thorium metals and alloys; the other for making flints for lighters. Ronson has purchased the assets of Cerium Metals Corp., signed an agreement to use the rare-earth facilities of Th. Goldschmidt AG. (Essen, Germany).

**W. R. Grace** has purchased the assets of Endura Corp. (Quakertown, Penn.), producer of pressure-sensitive tape packing; and Vellumoid Co. (Worcester, Mass.), which makes nonmetallic gaskets. Dewey and Almy Chemical Division will absorb the new activities.

## EXPANSION

**Methyl Methacrylate:** Du Pont will expand methyl methacrylate monomer capacity 40% at its Belle, W. Va., plant.

**Aluminum:** Alcoa plans a \$250,000 expansion of its Wenatchee, Wash., reduction works. Included: two new, 50,000-lb.-capacity hot-metal holding furnaces,

and a 10,000-lb. holding furnace for granulated ingots. It is also going ahead with its recession-deferred construction of a die-casting plant in Edison Township, N. J., to replace the smaller works nearby.

**Sulfate Pulp:** Rayonier Canada Ltd. will build a 250-tons/day bleached sulfate pulp plant in Wood-fibre, B.C.

**Phosphoric Acid:** Bunker Hill Co. (San Francisco) will build its \$2-million phosphoric acid plant in Kellogg, Ida., rather than at Kennewick, which is near the company's electrolytic zinc plant. Reason: availability of sulfuric acid at the new site. Initial capacity: 130 tons/day.

## FOREIGN

**Oil/Africa:** Shell Co. of East Africa, Ltd., and British Petroleum have signed an agreement with Kenya for construction of a \$36-million refinery at Mombasa. Completion date: '63.

**Rubber/England:** Hythe, Southampton, will be the site of International Synthetic Rubber Co.'s 2.5-million-gal./year synthetic latex plant. It will be 45% owned by Dunlop Rubber, the rest by Goodyear, Firestone and Michelin Tires.



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# Washington Newsletter

CHEMICAL WEEK  
September 26, 1959

Khrushchev's interest in U.S. chemical developments is evident in the side excursions he is making on his tour.

Iowa farmer Roswell Garst, who is playing host to the premier, plans to show him what has been done with chemical fertilizers in this country. Garst is president of a hybrid corn company. But he says Khrushchev already knows all about hybrid corn and is more interested in fertilizers and chemical feeds (e.g., urea) with which Garst is working.

The Russian leader listened attentively last week as U.S. scientists at the Beltsville, Md., Agricultural Research Center explained how recent chemical discoveries help control plant growth and kill weeds. He was shown how chemicals like gibberellic acid regulate growth through a hormone-like action, stimulating fruit production and aiding in multiplication of plants.

Probably the most important discovery unveiled to Khrushchev is a pigment that controls plant development. It may permit control of the flowering time of plants, the height of crops for convenient harvesting and other facets of plant growth. Beltsville scientists recovered two pigment forms from corn plants. Growth responses, they discovered, can be governed by a reversible chemical reaction controlled by light acting upon the two.

•  
A government move to break the steel strike impasse probably with a Taft-Hartley 80-day injunction, is looked for in about two weeks, if conditions still look hopeless then. But the Administration wants to avoid this move, which would only delay the need for a settlement. Meanwhile, it is exerting subtle pressure on the companies to yield a modest wage hike. The steel companies will soon be subject to pressure also from steel users who are already feeling shortages in special categories.

Impact of the steel strike on unemployment is negligible so far, says the latest Labor Dept. report. Only four of the 18 heavy steel-consuming areas (Duluth-Superior, Kansas City, Indianapolis, Louisville) have experienced layoffs of 1,000 or more. More than 80% of these are railroad workers. But the end of September may show significant deterioration in the situation, as stockpiles dwindle.

The effect of the strike will be inflationary. Gross national product is held down by the absence of steel production, but the economy hasn't actually been slowed down to any appreciable extent. The strike's end will release pent-up inventory demand that would not have existed if the strike had not occurred.

•  
Disposal of excess strategic metals and minerals in the nation's stockpile will be a big issue in the coming election year. The Administra-

## Washington Newsletter

(Continued)

tion wants to unload \$3 billion worth of goods and will ask Congress for broader stockpile disposal authority. A new national materials reserve inventory would be set up from which OCDM could authorize sales without specific Congressional authorization. Mining-state congressmen will fight it, of course, but most minerals experts in Washington concede that some eventual disposal is a near certainty.

Meanwhile General Services Administration discloses that it will ask Congress to approve sale of 470,000 tons of stockpiled rubber. Sale would be stretched over nine years to avoid hurting domestic rubber prices.

•  
**Cheaper freight rates on bulk shipments will result** from the Interstate Commerce Commission's ruling approving piggyback rail service—hauling loaded truck trailers by flatcar. Truckers view it as a major setback.

The policy decision approved the type of service now offered by the rails between New York and Chicago, where freight forwarders will haul two loaded truck trailers for \$451.50, regardless of what commodity is hauled or what the weight is. Piggyback service will now spread to other routes. Truckers plan to carry their fight to the courts.

•  
**Recall of a hairwaving product from the market** has been issued by the Food & Drug Administration because the product contains a neutralizer solution that can cause severe eye irritation. The Richard Hudnut Co. is cooperating in warning the public and withdrawing the item, Fashion Quick Salon-Tested Permanent Wave. The ban does not apply to Quick home permanent, which contains no shampoo neutralizer.

•  
**A move to boost grants for constructing sewage treatment plants** is being held back until Congress reconvenes. Congress could have reported out a bill in the adjournment rush. The Senate had voted to increase the standing \$50-million annual authorization to \$80 million, and the House upped the figure to \$100 million. But the conference committee knew these generous grants were headed for a pocket veto. Next year, they hope, budget pressure may be eased.

•  
**The growth trend of West Germany's chemical industry** has slackened, but it is still the fastest-growing business in the country. Commerce Dept. figures for '58, just released, show heavy investment in the petroleum branch and a 7% increase in pharmaceutical production, of which 75% is consumed domestically.

Sharper competition in the international market exerted pressure on exports, which advanced only 2.5%. Exports to European countries increased, but trade with the American continent declined. Purchases from the U.S. increased 15%, while exports to the U.S. declined 8%.





## If you can't see four airplanes, lift the flap

In one year there were nine mid-air collisions among 1600 training aircraft of the Air Force's Air Training Command. Student pilots did not see each other in time to avoid a collision. In a program to prevent this type of accident, the Air Training Command, which flies one-third of the total Air Force hours each year, pioneered in the use of fluorescent painting of aircraft.

The following year, there were only two mid-air collisions, neither one involving fluorescent painted aircraft. A major factor in this drastic reduction was the application of coatings that fluoresce.

It is generally believed that all strongly fluorescent organic materials have a molecular structure which, when excited by outside sources of energy, emit light. The emitted light is always of a lower energy level (longer wave length) than the exciting light. For example, irradiation with "bluish" light can produce "reddish fluorescence". An important fluorescent pigment contains a form of rhodamine, derived from benzene and naphthalene. Toluene sulfonamide, derived from toluene, is a vital constituent of this resinous pigment matrix. The extending of coatings made with this matrix is accomplished by using toluene and xylene.

United States Steel is a producer of phenol, naphthalene, toluene, and xylene, as well as a full line of high-quality coal chemicals. For more information, a USS Chemical Product Catalog is available for the asking. Write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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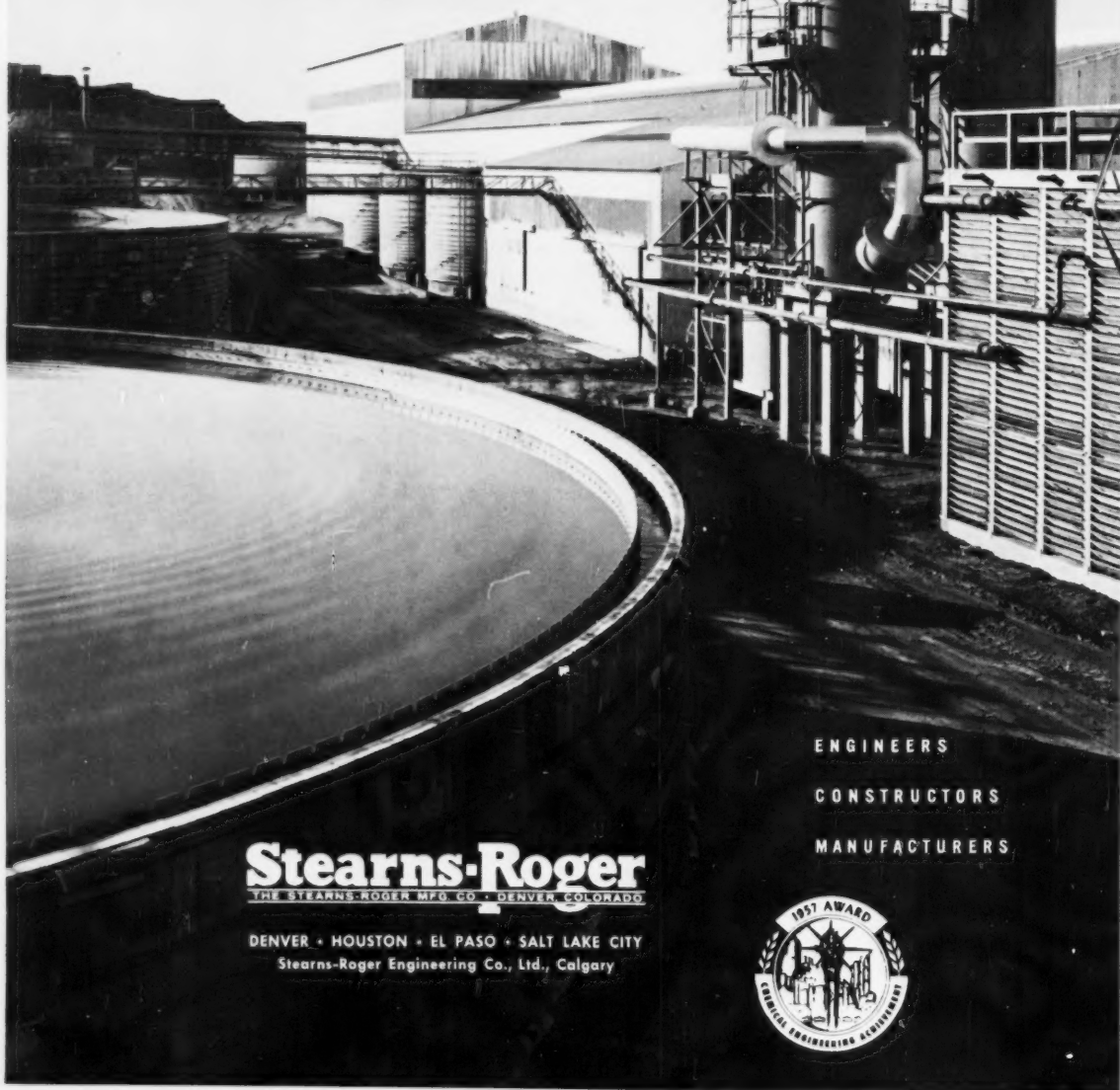


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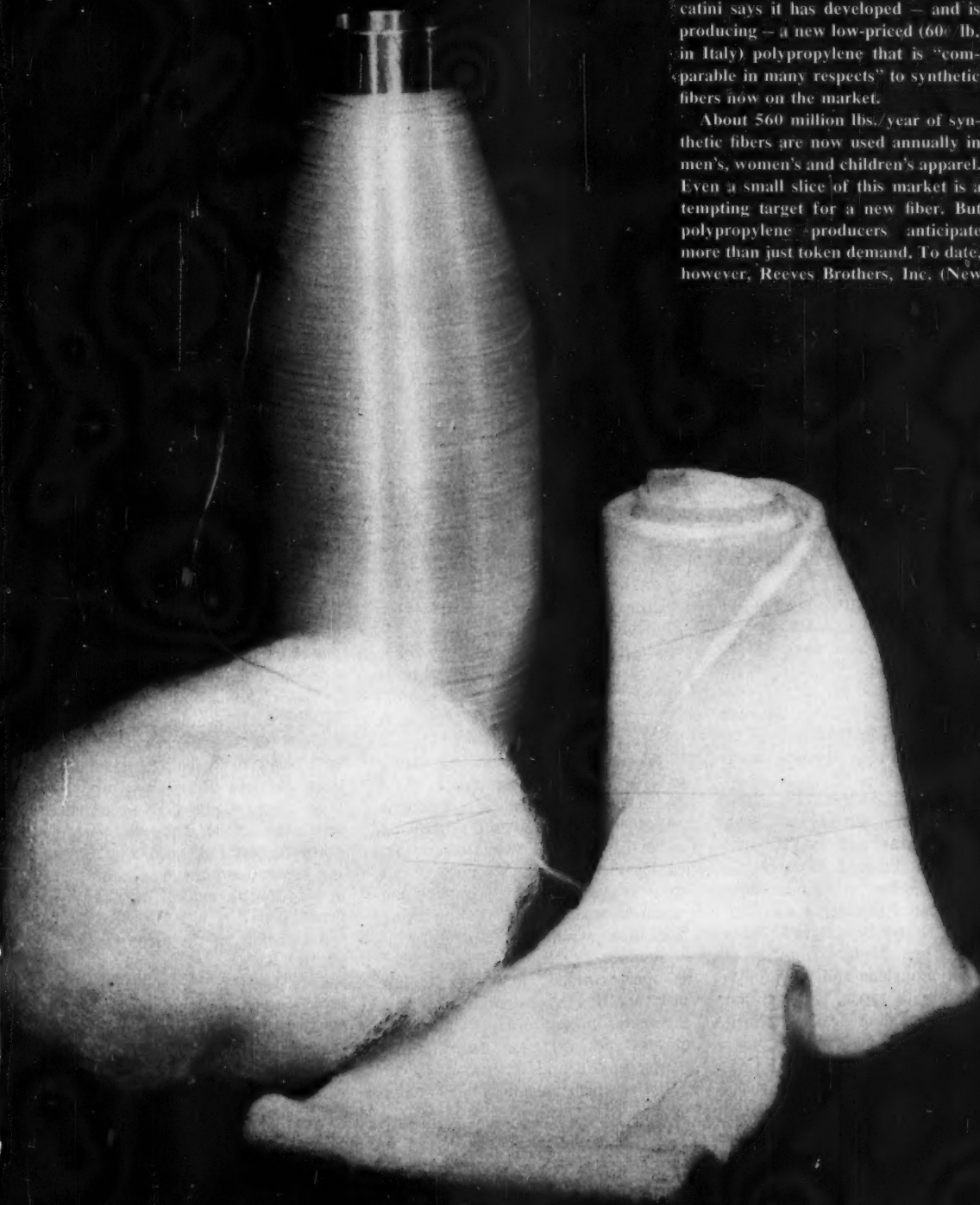


# RESEARCH

## Polypropylene Fiber—Ready for the Mill

Polypropylene landed feet first in the textile fiber pond this week. Montecatini says it has developed — and is producing — a new low-priced (60¢/lb. in Italy) polypropylene that is "comparable in many respects" to synthetic fibers now on the market.

About 560 million lbs./year of synthetic fibers are now used annually in men's, women's and children's apparel. Even a small slice of this market is a tempting target for a new fiber. But polypropylene producers anticipate more than just token demand. To date, however, Reeves Brothers, Inc. (New



## RESEARCH

York), is the sole producer of textile-oriented polypropylene yarns (*CW Technology Newsletter*, Sept. 5) in the U. S.

Montecatini says its new fiber is "particularly suitable to be used, either pure or blended, in all the various applications of wool." The same goes for its use with cotton. In covering power, 40¢ worth of the new fiber is said to be equivalent to 1 lb. of wool—worth \$1.35, or 1 lb. of cotton—worth 35¢.

Features claimed for the new Montecatini entry: low specific weight (0.91, enabling manufacture of fabrics with exceptionally light but "full" texture); high tensile strength and resistance to abrasion; resistance to acids, alkalis and machine washing; low static electricity, which eliminates a common synthetic failing—the tendency to pill.

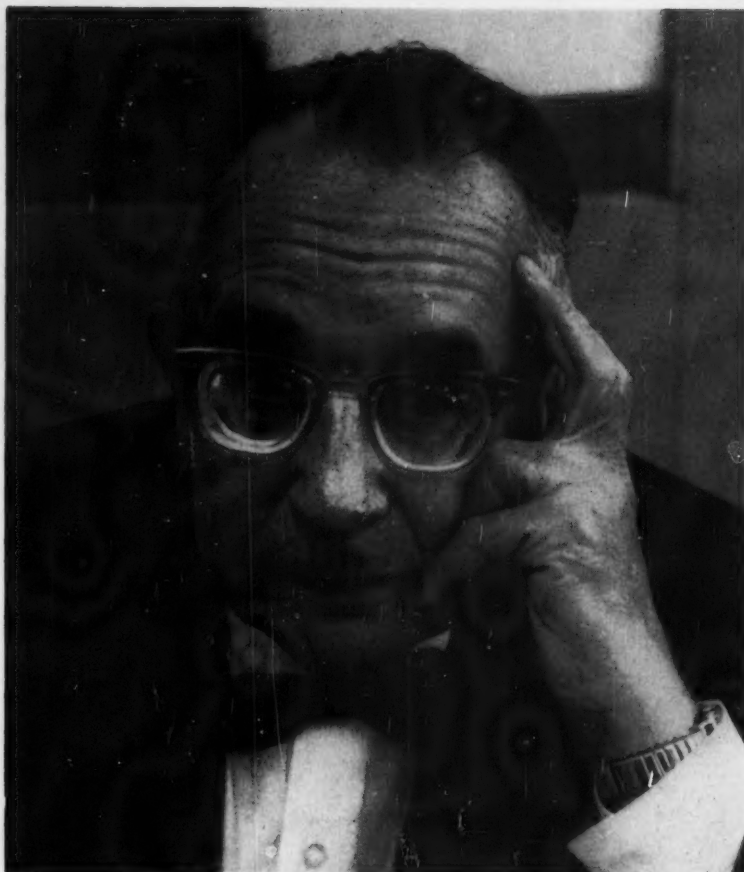
Starting next month, Montecatini plans to have onstream a 10-million-lbs./year-capacity plant for staple, continuous multifilament and monofilament yarns. By '60, the output may amount to 30 million lbs./year.

**Dyeing No Problem:** A common drawback with polyolefin yarns—the difficulty in dyeing them in blends or at least in supplying the virgin yarn in variegated colors—isn't worrying Montecatini. The firm says: "This fiber can be supplied already spundyed in an extensive range of colors at very low additional cost. It can also be directly dyed even when blended with other fibers."

This offers plentiful possibilities. The polypropylene textiles already shown by Montecatini (e.g., at the Chemical Industries Exposition at New York's Coliseum in '57, the American Chemical Society Meeting in San Francisco in '58) include fabrics for car robes, sweaters, socks and suitings.

Reeves is just as ambitious concerning its new yarn, similarly available in both filament and staple form. Reeves hasn't matched Montecatini's display of finished goods, however. The Montecatini textile research center (Terni, Italy) has recently been showing a line of fabrics made of 100% polypropylene and polypropylene blends with rayon, wool, cotton and linen, including "gaily" colored floral, geometric and period prints.

Reeves' research director and vice-president, Victor Erlich, is particu-



CW PHOTO—ED WALLOWITZ

**Reeves Brothers' Erlich sees polypropylene competing with nylon.**

larly interested in competing with nylon. Of the Reeves polypropylene, spun and converted at the firm's Spartanburg, S.C., plant, Erlich says, "Polypropylene will be cheaper to produce in the future than any other polyolefin and, from a coverage point of view, will be cheaper than nylon." (Specific gravity of polypropylene is less than nylon's 1.1.)

Reeves has also produced fabric using its newly commercial (3-22 denier/filament) yarn. Still, Erlich is more cautious about its potential. At a Textile Research Institute meeting, earlier this year, Erlich pointed out some of the obstacles polypropylene faces before it enjoys equal footing with other synthetics.

**Stability Problem:** Since the fiber is melt-extruded, heat-stability has been another Erlich worry. This was a "matter of concern," says Erlich, at practical extrusion temperatures between 220 and 290 C (430 to 550 F), which are much higher than

the melting point. "This matter is now under control," he reports, "because the resin producers are adding adequate stabilizers to counteract deteriorating oxidation, at least during the short periods of exposure in the extrusion equipment."

Erlich also is optimistic about stabilizing fibers against degradation by sunlight (a severe drawback in the early days of polyethylene) and believes the new Reeves polypropylene fibers "lend themselves to desirable textile operations. They can be spun, crimped, textured, used for knitting, for woven and nonwoven fabrics, and in blends with natural or other synthetic fibers."

Limitations of the present polypropylene fiber, says Erlich, prevent Reeves from "... building a new skyscraper in the textile district." But he is confident existing drawbacks, particularly in dyeing and pigmentation, can be overcome.

**More to Come:** Meanwhile, other

# M&T Chemicals

**TIN CHEMICALS**  
**ORGANOMETALLICS**  
**INORGANIC CHEMICALS AND MINERALS**  
**PVC STABILIZERS**  
**URETHANE CATALYSTS**  
**PLATING CHEMICALS**  
**INDUSTRIAL PROTECTIVE COATINGS**

## TIN CHEMICALS

Listed here are the most popular of M&T's tin chemicals. As the leading company in tin chemicals production and research, M&T has developed many others and invites inquiries in this area. See, also, "Organometallics and Other Development Chemicals" below.

Sn<sup>++</sup>

### INORGANICS

Stannic Chloride—Anhydrous  
 Stannic Chloride—Pentahydrate  
 Stannic Oxide  
 Stannous Chloride—Anhydrous (Stannochochlor®)  
 Stannous Fluoride  
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 TIN SOAPS . . . including Stannous Oleate and Stannous Octoate.

### ORGANOTINS

Dibutyltin Diacetate  
 Dibutyltin Dilaurate  
 Dibutyltin Di-2-Ethyl Hexoate  
 Dibutyltin Maleate  
 Dibutyltin Oxide  
 Tetraethyltin  
 Tetraphenyltin  
 Tributyltin Oxide (TBTO®)

Sn<sup>+++</sup>

## INORGANIC CHEMICALS and MINERALS

These specially processed chemicals and minerals are intended primarily to meet the uniformity requirements of the Ceramics and Glass Industries.

Sb

**ANTIMONY OXIDE (Sb<sub>2</sub>O<sub>3</sub>) AND SODIUM ANTIMONATE (Na<sub>2</sub>O·Sb<sub>4</sub>O<sub>5</sub>·½H<sub>2</sub>O)...** Opacifiers for vitreous enamels.

Zr

**ZIRCONIUM SILICATE (ZrSiO<sub>4</sub>)** . . . Offered in granular form and as finely milled ULTROX® Opacifiers in a range of fineness grades.

Ti

**RUTILE (TiO<sub>2</sub>)** . . . Available as VIRFLUX® Virginia Rutile and Australian Rutile for pigmenting applications and as a low-cost chemical source of titanium.

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Sn

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**THERMOLITE® 112 Ba-Cd STABILIZER**—A unique aromatic-based Ba-Cd system. Thermolite auxiliary stabilizers of the liquid-zinc and organic-antioxidant types are also available.

### URETHANE FOAM CATALYSTS

M&T Catalyst T-12 (Dibutyltin Dilaurate)  
 M&T Catalyst T-8 (Dibutyltin Di-2-Ethyl Hexoate)

Stannous Oleate  
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Sb

**FLAME RETARDERS**—Thermoguard® "High Opacity" and "Low Opacity" antimony oxides. M&T Flame Retarder — antimony-based, with one-fifth the opacifying power of antimony oxide.

\*Trade Mark

## ORGANOMETALLICS and other Development Chemicals†

In addition to the commercial products listed above, a wide range of organometallics are available from M&T's *Commercial Development Division*. Those listed here are offered in pilot-plant quantities. Hundreds of others have been catalogued or are available as research samples.

Sn

### ORGANOPHOSPHORUS

Tributylphosphorus  
 Triphenylphosphorus  
 Triphenylphosphorus Dichloride  
 Triphenylphosphorus Oxide

### ORGANOANTIMONY

Tributylantimony  
 Triphenylantimony  
 Triphenylantimony Oxide  
 Triphenylantimony Dichloride

### ORGANOSILICON

Diphenyldichlorosilane  
 Phenylmethyldichlorosilane  
 Diphenylsilane  
 Diphenyl Di-n-Dodecylsilane

P

### ORGANOTIN

Dimethyltin Dichloride  
 Dimethyltin Oxide  
 Dibutyltin Sulfide  
 Tributyltin Orthophenylphenate

Tributyltin Acetate  
 Tributyltin Dodecyl Succinate  
 Triphenyltin Chloride  
 Diphenyltin Dichloride

Dilaurytin Dichloride  
 Dioctyltin Oxide  
 Tetraethyltin  
 Di-2-Ethylhexyltin Oxide

Sb

### Stannonium Compounds

Bis Dilaurylamino triphenylstannonium Chloride  
 Diethylaminodibutylstannonium Dichloride  
 Dipiperazinodibutylstannonium Dichloride  
 Diphenothiazinodibutylstannonium Dichloride

Si

Bi

### INORGANICS

Stannous Gluconate  
 Stannous Oxalate

Stannous Stearate  
 Stannous Tartrate  
 Other Tin Soaps

### ORGANOBI SMUTH

Triphenylbismuth

† Please address inquiries regarding this group of chemicals to *Commercial Development Division, Metal & Thermit Corporation, 100 Park Avenue, New York 17, N. Y.*

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SPECIFIC GRAVITY, 20°/4°C . . . . .	1.046
INDEX OF REFRACTION $n_D^{25^\circ C}$ . . . . .	1.4056
FLASH POINT, Cleveland Open Cup . . . . .	100°F
POUR POINT . . . . .	< -75°F
TOXICITY (Single oral dose—rats—LD <sub>50</sub> ) in mg/kg . . . . .	2000

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## RESEARCH

polyolefin producers are bearing down on the same problems. AviSun (Philadelphia), new polypropylene producer (*CW*, July 18, p. 71), is looking at fibers, drawing on the know-how of parent American Viscose Corp., which in turn has already successfully encroached on nylon and acrylic markets (with Monsanto) via the Chemstrand Corp. (Decatur, Ala.).

Phillips Chemical Co. (Bartlesville, Okla.) tells *CW* that "petrochemical sources of fiber polymers are just started." Phillips, current producer of Marlex linear polyethylene, "will continue to evaluate all its polymers as fiber potentials and will develop applications for its commercial products where an encouraging future is indicated." The Marlex 5000 series is an ethylene-butylene copolymer that, Phillips says, "sells well in monofilament and ribbon yarn, is particularly well suited for load-bearing applications."

Other new fibers are coming—Celanese, for example, hints it is hatching a surprise. Montecatini and Reeves Brothers, meanwhile, plan to cash in on the fiber-hungry present.

## Searching Question

How long before the Russians have ultrafast machines to search scientific literature? As little as two years, according to corridor talk in Cleveland's Tudor Arms Hotel during last week's International Conference for Standards on a Common Language for Machine Searching and Translation. The conference was sponsored by Western Reserve University and Rand Development Corp. (Cleveland).

The best U.S. machine, according to conferees, is General Electric's new Model 250, which can search 100,000 articles per hour for 10 questions at a time to provide 1 million responses. This and a new IBM machine are keeping the U.S. in the lead, says Allen Kent, associate director of the documentation and communication research center at Western Reserve.

But he believes the Russians are shooting for 1 million responses per minute, although they're not saying how close they are to this target. Machine searching and translation of scientific and technical literature is a top assignment at the U.S.S.R. Academy of Science, Kent was told by

the academy's president, Alexander Nesmeyanov. About 10 times as many people are working on the problem there as in the U.S.

Conferees also debated the advisability of the U.S.'s developing a translating machine, and what sort of a machine it should be—a word-for-word translator, or one which provides alternate translations in doubtful cases.

Meanwhile, much time is being spent in the effort to find a practical, economic solution of the mountainous chore of literature searching. One sign of progress: early in '60, the American Society for Metals (Cleveland) will begin mechanical searching of worldwide metallurgical literature.



## See-Through Ceramic

This new polycrystalline ceramic, hot from the furnaces at General Electric Research Laboratory (Schenectady, N.Y.), is translucent, unlike conventional ceramics (*right*). The newcomer, called Lucalox, transmits at least 90% of light; print, for example, may be read through it when it is laid flat on paper. Made of high-purity aluminum oxide powder pressed at room temperature, Lucalox is fired at "temperatures higher than usual for ceramics," according to GE. The firm sees applications for it in extending service of high-temperature lamps (fused quartz performs satisfactorily up to 1800 F; Lucalox is stable up to 3600 F), in infrared lamps, missile nose cones, and a wide range of scientific, military and industrial uses.





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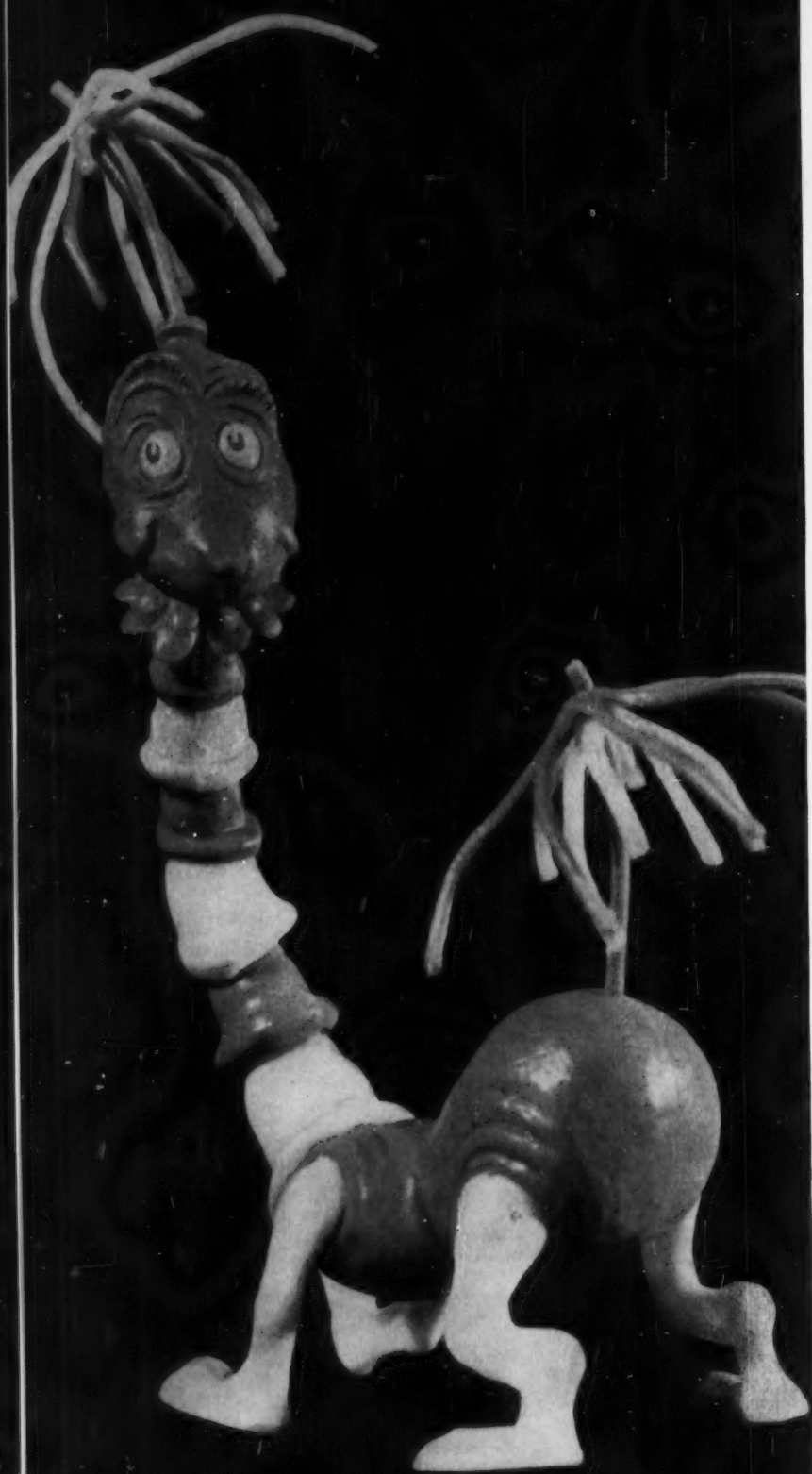
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Bizarre plastic figures of

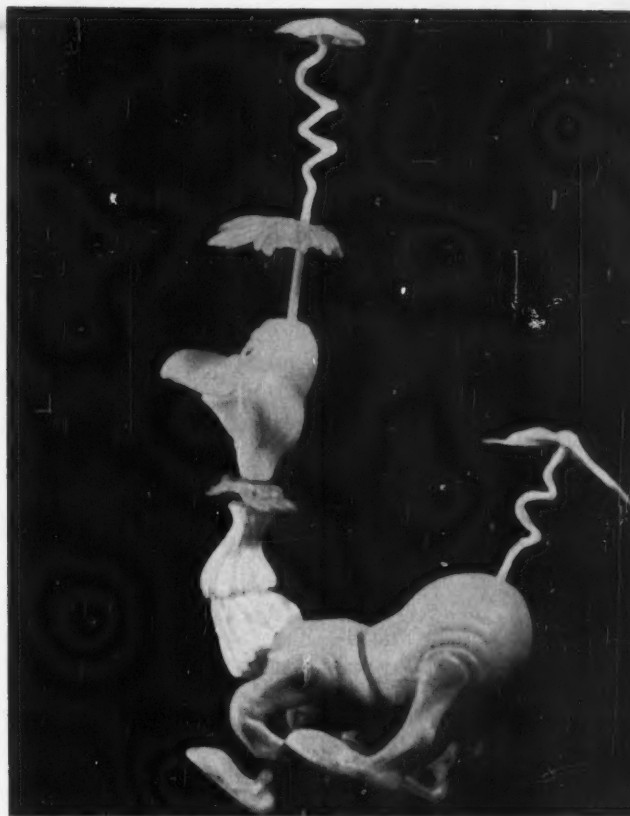
## Odd Menagerie

Within the next few weeks, U.S. toy makers will begin stepping up their pre-Christmas promotional campaigns to a last-minute fever pitch. In an early start, one manufacturer, backed up by its plastics supplier, last week launched a nationwide campaign designed to promote a new toy that may rival last year's hula hoop (CW, Oct. 11, '58, p. 117) as a plastics consumer.

The new product, which has already won the attention of the nation's toy manufacturers, is the Dr. Seuss Zoo (see pictures). Producer: Revell (Venice, Calif.), a leading maker of plastic hobby kits. The plastics supplier: Grace Chemical, which last year helped send plastic hoops rolling into toy markets throughout the world.

Dr. Seuss's Zoo consists of several basic animals of bizarre appearance that can be put together from colorful high-density polyethylene parts. One special attraction of the toy is the almost infinite number of other weird creatures that can be created





Dr. Seuss toy zoo pose provocative question . . . Another polyethylene bonanza in the making?

## Backs Plastics' Bid for Bigger Toy Market

by interchanging parts of the basic animals.

Enthusiasm for the set's market possibilities skyrocketed following test marketing on the West Coast. Revell spokesmen say stocks in two department stores were sold out in a single day, although it was a "bad" selling time—the hottest part of the summer.

**Craze or Continued Success?** Toy buyers immediately labeled the Dr. Seuss Zoo "another hoop-type craze," but Revell insists that it isn't just another short-lived fad item, will instead be a long-time money-maker. Reason: the toy is based on well-known, fanciful characters invented by Dr. Seuss for his children's books. These will, it's believed, introduce the polyethylene animals to each new crop of youngsters.

Initial success of the zoo surprised even Revell, and production became a major "problem" overnight. First big run on the zoo will be worth about \$1.5 million on the wholesale level, require over 500,000 lbs. of

plastic worth nearly \$200,000.

**Still to Be Proved:** Success of Dr. Seuss toys, tied to an established juvenile item, is still to be demonstrated. Success of the fad approach (hula hoops)—and its limitations—are now a matter of marketing history.

The '58 hoop craze was spectacular while it lasted, but it petered out almost as rapidly as it began. Nonetheless, in a few short months, hoop manufacture consumed an estimated 10 million lbs. of high-density polyethylene, perhaps as much as 15 million lbs. Conservative estimates value this at \$3-5 million.

Today, the hoop business is admittedly dead, as a check of leading department and toy stores will confirm.

**Outlets for All:** Just how big is the over-all U.S. plastics market for toys? Reliable statistics are hard to come by. Celanese market analysts, however, have made one of the most detailed consumption estimates for '59.

They say total plastics consumption for manufacture of toys in the U.S.

in '59 will run between 100 million and 120 million lbs. This total market breaks down as follows in (million pounds): conventional- and medium-density polyethylene, 20-25; linear polyethylene, 10-12; polystyrene, 40-45; cellulose acetate, 8-10; vinyl, 20-30; various other thermosetting plastics, 2-3 million lbs.

To this, Celanese adds further observations: linear polyethylene is replacing some conventional- and medium-density polyethylene and some polystyrene, but basically it's crowding wood and metal out of toy applications.

One big reason for the rapidly increasing use of polyethylene is development of blow-molding techniques. Advantages—better rigidity of molded articles, less scrap.

Cellulose acetate—an old-timer in toy making—is still finding new markets because it's a tough plastic, costs little, provides good gloss and colorability, and is available in clear, transparent form.

It is also difficult to pin down the

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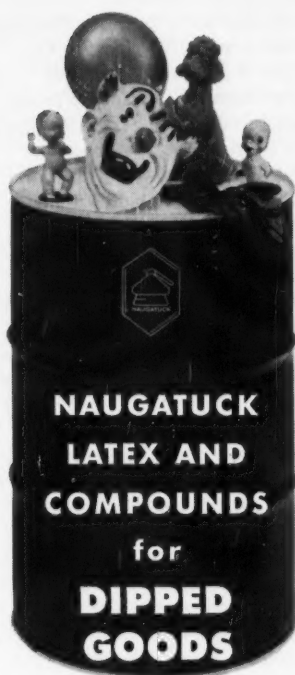
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## MARKETS

actual volumes of various plastics used to make specific types of toys, e.g., trains, dolls, hobby kits. These are about the only generalizations possible: dolls and inflatable toys are usually made of vinyl; hobby kits (which are put together with adhesives) and other toys which also require structural rigidity and fine detail (e.g., trains) are of polystyrene; "hard-knock" items such as the "flying saucers" used for sliding on snow are of polyester. Polyethylene seems to be well represented in production of all these items.

Plastic requirements of individual toy manufacturers obviously vary greatly, depending on size of business and types of toys made. A. C. Gilbert—a firm perhaps best known for its trains, Erector sets—now uses about 400,000 lbs. of plastics annually. It buys about 300,000 lbs. of polystyrene, at about 32.5¢/lb.; the other 100,000 lbs. of plastics consist of various types, including nylon. Thus, raw-material costs average out to about 80¢/lb., some of the plastics cost as much as \$1/lb.

About 40% of total plastics consumed by Gilbert goes into manufacture of trains, the other 60% into miscellaneous toys.

(The three leading train manufacturers are Lionel, Gilbert, Marx; there are hundreds of smaller train makers. Lionel and Gilbert, it's estimated, jointly account for about 60% of the nation's toy train business.)

The term "toy" covers many items that aren't sold to children alone. Games and hobbies, for example, use sizable amounts of plastic. And, more recently, the definition of a toy has been complicated by increased use of top-quality plastic models, etc., by scientific, engineering, educational and advertising organizations.

For example, Revell spokesmen say its plane and missile models are used by the U.S. Army as training aids "after modifications and additions." Model planes of plastic are also replacing costly wood and metal planes in wind-tunnel tests. An increasing number of models are used in the nation's classrooms, and are landing on desks of admen who are discovering the value of detailed models as advertising gimmicks.

**Hobby-Kit Buildup:** The hobby-kit business—has made striking gains in the last decade, as a result of ad-

vances in plastics technology. One trade estimate puts total plastic model-kit sales at some \$75 million in '58—a substantial part of the total \$1.5 billion spent on all toys. Another estimate puts current plastic-kit sales at \$100 million/year.

A recent analysis of the hobby-kit market by Monsanto's Market Development Dept., in cooperation with National Family Opinion, Inc., shows who buys and uses plastic kits. Of 891 families responding to the survey, 40% reported that at least one member of the family had assembled at least one plastic kit.

The survey also revealed a virtual mandate to the toy industry to manufacture kits for girls—a largely untapped, big-potential area. Only 5% of girls and women sampled had assembled a plastic kit. Possibilities: doll furniture, household objects, villages, dolls and doll houses, appliances, flowers.

There have also been many suggestions for kit improvement—one in particular is a challenge for CPI researchers: better glues. Incidentally, while better glues are sought for use with regular polystyrene kits, there's another sales bonanza awaiting the firm that comes up with a good glue for polyethylene. Toy makers say polyethylene consumption for toys would soar if a satisfactory glue could be developed.

**CPI Toy Promotion:** The Monsanto survey is but one example of promotional projects undertaken by major plastics suppliers who try to help toy manufacturers expand their markets. Celanese boasts of its "Honor Roll," which is basically a catalog of tested and approved toys. It's sent to thousands of toy buyers. Union Carbide Plastics helps promote specific items made of UCP plastics (examples: Gerber Plastic's new "Willie Worm," Rainbow-Crafts' low-priced —\$7.95—all-plastic projector).

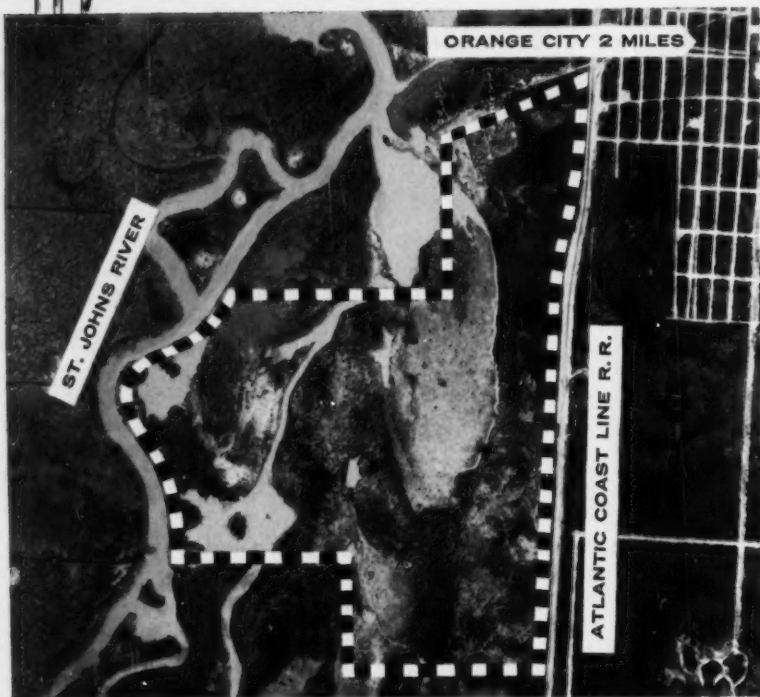
**One-Way Foreign Trade:** So far, U.S. plastics makers haven't worried too much about foreign toy imports. U.S.-foreign toy trade is pretty much a one-way street; toys are shipped to the U.S. from several countries; but U.S. toy firms that compete overseas generally find it preferable, economically, to build plants in the consuming areas rather than ship from U.S. plants.

Up to now, impact of foreign-made





# PINCHED FOR WATER?

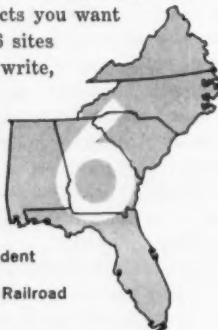


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## MARKETS

toys in U.S. markets has come mainly from items made from nonplastic materials. Leading foreign toy exporters to the U.S. are, in order of importance: Japan (mostly metal products), Germany (75% metal, 25% plastic), Italy (75% metal, 25% plastic).

But the metal-to-plastic ratio of foreign toys is rapidly changing as plastics become more readily available overseas. Two factors that have heretofore favored production of metal rather than plastic toys in other countries: low labor costs, expense of molds needed to make plastic toys (some molds used in the U.S. cost as much as \$75,000).

The combined efforts of plastic toy manufacturers and raw-material suppliers are constantly broadening the plastic toy market. And while certain promotional successes provide increased business for CPI firms, as well as toy makers, plastics will gain dominance in the toy industry only by continuing, down-to-earth market analyses of U.S. toy-buying habits, coupled with product improvement.

## Ammonia Price Muddle

California's ammonia market is headed for another competitive hassle because of a new pricing schedule posted last week by Best Fertilizer of Lathrop, Calif. The firm set a new price of \$72/ton on anhydrous ammonia delivered anywhere in California's Central Valley.

Previous price tag was \$66/ton, f.o.b. plant. Reason for the change, says a Best spokesman, is to simplify the complicated problem of freight equalization. With seven ammonia plants in California, he noted, "it just doesn't make sense to have an f.o.b. pricing system in the state"—a situation that would be acceptable if there were just one plant in the north, one in the south.

To avoid freight equalization headaches, Best calculated its average freight rate at \$6/ton, added that to the base price of \$66 to arrive at the new delivered price (effective Oct. 1) of \$72/ton.

Despite Best's explanation of the move, there's West Coast trade speculation that entry of Valley Nitrogen, a co-op, into the ammonia picture was a factor in prompting the price move,—i.e., to prevent encroachment into "Best territory" by the newcomer.



Valley Nitrogen's new, \$9.5-million anhydrous ammonia plant at Helm, Calif., went onstream just recently. An initial shipment of 22 tons was distributed to growers in Kings County in California's San Joaquin Valley. When operating at capacity, Valley Nitrogen's plant will make 150 tons/-day of ammonia. The co-op also plans to produce ammonium sulfate, ammonium phosphate and phosphoric acid.

Other ammonia producers in the area have made no move to follow the new pricing, although some firms acknowledge they are considering such action. One producer candidly says that it really doesn't make much difference whether it goes along officially or not, that if business is threatened by Best or others it will simply cut its price to try to beat competition.

Typical industry response to Best's maneuver is exemplified in the reaction of Paul Foreman, treasurer of Collier Carbon & Chemical. Awareness of Best's action, says Foreman, is bringing no immediate decision by Collier to follow Best in swerving from "a long-accepted industry policy."

The only other statement of position by Foreman was a terse "no comment"—about the only thing anyone in the industry is ready to say right now.

## MARKETPLACE

Viton synthetic rubber price is slashed 33%—from \$15/lb. to \$10/lb.—by Du Pont. The fluorine-containing elastomer can be used in temperatures up to 600 F, finds uses in aircraft, missile and industrial applications.

•  
**Du Pont's Freon fire extinguisher**—containing Freon-13B1 monobromotrifluoromethane pressurized with nitrogen—is approved by the U.S. Army Corps of Engineers (*CW Market Newsletter*, Aug. 29). The units contain 2.75 lbs. of Freon-13B1; others containing 15-50 lbs. of Freon are being developed.

•  
**Polypropylene molding and extrusion compounds** are added to Catalin's line of plastic materials. Three grades are available: general purpose, heat resistant, ultraviolet resistant.



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Catalin field representatives, experienced in the processing problems of the textile industry, welcome the opportunity to submit samples and discuss the cost-cutting and quality advantages of Resin 8171. Inquiries invited.

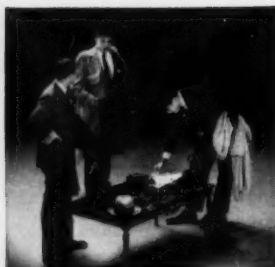
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## Polyol Portraits:

# the POLYGLYCOLS



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men that  
make the  
most of them"

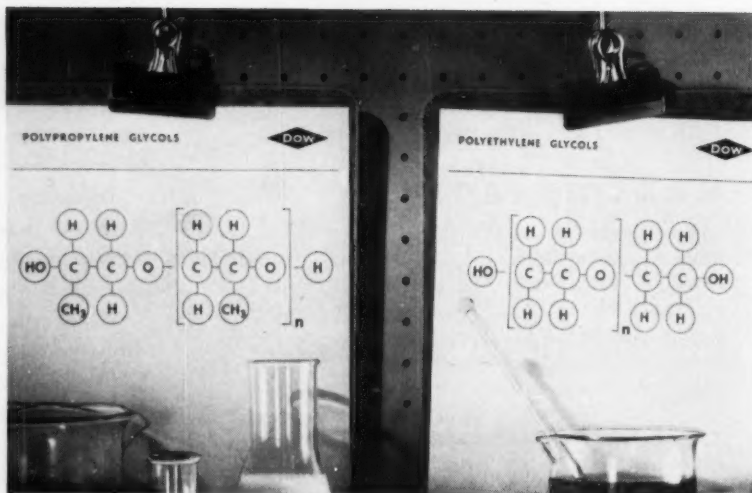


The polyglycols—relative newcomers to the chemical scene—are rapidly entering industry after industry in new capacities as intermediates and formulating ingredients. What do polyglycols have that causes such rapid expansion? They are so exceedingly varied and adjustable that chemists can virtually write their own prescriptions of physical and chemical properties and, chances are, a polyglycol can be developed to fit them.

The list of valuable polyglycol characteristics is extensive: High flash point, thermal stability, excellent lubricity, wide viscosity ranges, non-corrosiveness, ease of esterification, low toxicity and many other desirable properties that have a wide range of application.

*These properties can be blended into almost endless combinations depending primarily upon the oxides used.* Dow, with five high-quality oxides, is able to provide the widest available range of polyglycols. These five oxides (ethylene, propylene, butylene, epichlorohydrin and styrene oxides) place Dow in an ideal position to develop polyglycols with made-to-order properties. For example . . .

The automotive industry needed a material for use in hydraulic fluids with properties similar to those of castor oil.



Portrait of two valuable formulas in the working vocabulary of creative chemistry.

Dow's answer was the new Polyglycol 11 series, a family of five new trihydroxy polypropylene glycols made by adding propylene oxide to glycerine. The compounds are viscous liquids through the entire range of the five viscosities, 80 through 400 cks. at 100°F. Besides having properties needed for use in hydraulic fluids, members of the 11 series have proved successful as plasticizers and also show promise as ingredients in hair oil—a typical ex-

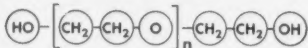
ample of versatility. Other Dow series provide equally valuable properties, equal versatility.

*New applications* and new polyglycols are being continuously investigated by Dow. Literally *hundreds* of Dow polyglycols are now available and *thousands* more are possible from "the men that make the most of them." The two broadest branches of the Dow polyglycols, which have been well estab-

lished throughout the years of polyglycol development, are the polyethylene glycols and the polypropylene glycols.

### The Polyethylene Glycols

The polyethylene glycols are available as liquids or solids, in a molecular weight range from 200 to 20,000. Polyglycols E200, E300, E400, and E600 are liquids. E1000, E500M, E1450, E4000 U.S.P. and E4000, E6000, E9000 and E20,000 are solids.



The liquids are viscous, nearly colorless, water-soluble and have low vapor pressure. They are completely miscible with a large number of organic liquids but are only slightly soluble in aliphatic hydrocarbons. And they have this very interesting characteristic: their viscosities and solubilities in organic solvents rise with increasing molecular weight; while their vapor pressures and hygroscopicities decrease.

The solids, like the liquid members of the series, are soluble in water and many organic solvents. Melting or freezing points rise as the molecular weights of these relatively non-hygroscopic polymers increase.

The terminal hydroxyl groups enable the polyethylene glycol molecule to take part in esterification and etherification reactions. The resulting esters and ethers are often useful surface-active agents or solvents.

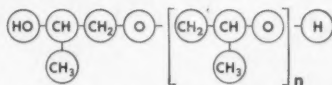
The excellent chemical and physical properties of the polyethylene glycols make them ideal for a multitude of uses. Because of their water solubility,



Twelve different polyethylene glycols ranging from liquid to solid offer unique opportunities for product improvement.

low order of toxicity and wide range of compatibilities, polyethylene glycols are being used in increasing quantities by the pharmaceutical and cosmetic industries as bases and carriers. The PEG's are equally important in such uses as mold release agents, cellulose plasticizers, process lubricants, and many others.

### Polypropylene Glycols



This family of six light-color, slightly oily liquids has physical and chemical properties derived from methyl side chains, many ether linkages and from terminal hydroxyl groups. The hydroxyl groups enable the polyglycols to take part in reactions in a manner similar to that of a secondary alcohol.

Available in molecular weights ranging from 250 to 4,000, these versatile polyglycols find application in a wide variety of products and processes because of their excellent lubricating and solvent properties. They are characterized by their high flash points, low volatility, excellent solubilities, good viscosity-temperature relationships, low pour points, low surface tensions, low hygroscopicities and their ability to react with fatty acids to form interesting surface-active materials. These properties, which vary considerably with average molecular weight, can be combined by blending members of the series, presenting endless opportunities for uses in automotive products, cosmetics, dyes, printing inks, leather, plastics, textiles and vegetable oils.

Dow's technical service men are prepared to meet your precise requirements. Often, their broad experience saves valuable time and adds the refining note to a given application.

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Whether you're in the market for glycols, PPG's, PEG's, glycerine or any of the hundreds of other Dow polyols, you receive these benefits:

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3. Multiple production and supply points, at strategic locations throughout the country, assure you of prompt service and delivery.
4. From the creative cauldrons of polyol chemistry at Dow come scores of new polyol products and polyol improvements each year.

There are literally *no material limits* to the range of new developments that can be custom-made for Dow customers!

★ ★ ★ ★

*"The men that make the most of them"* stand ready to help you make the most of the polyol products you need. They are always at your service. If you have a polyol problem, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Chemicals Merchandising Department 1103AM9-26.

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Polybutylene Glycol • Styrene Glycol • Dowanol® 122 • Polyglycol 11 Series  
Polyglycol 13 Series • Polyglycol 15 Series

Oxides: Ethylene Oxide • Propylene Oxide • Butylene Oxide 5  
Styrene Oxide • Epichlorohydrin

**The Polyglycols** number many active members, among them three new products developed by Dow research—polyepichlorohydrin, polystyrene glycol, and polybutylene glycol. All three are adaptable as intermediates in the production of the new polyurethanes and in the surfactant field. Many promising applications also exist in paint, petroleum, detergents, plastics.

**The Polyethylene Glycols** are available in twelve molecular weights from E200 to E20,000, and ranging from viscous liquids through waxy and hard, tough solids. Very useful as plasticizers, lubricants, solvents and as carriers in many cosmetic and pharmaceutical preparations.

**The Polypropylene Glycols** "P" series, liquid through entire molecular weight range, P-250 through P4000. Employed as lubricants, solvents, plasticizers and anti-foam agents. Polyglycol P2000 (resin grade) has gained widespread acceptance for use in urethane foams.



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Hospitals faced with highly resistant pathogens are a major market for vaporized germ-killers.

## Bright Prognosis for Gas Sterilants

This week at National Drug Co.'s Swiftwater, Pa., installation, an attempt will be made to sterilize the interior of a newly completed one-story building that will be used for production of tissue-culture antiviral vaccine. The job of sterilizing the 6,500-sq.ft. building, if successful, could lead to a complete revision of procedures now being used to protect laboratories and other structures from harmful microorganisms.

According to U. S. Public Health Service regulations, a building used for turning out one vaccine can't be used for making any other. If National Drug proves it can completely sterilize the building, it has a strong *prima facie* case for asking USPHS to change this ruling.

To sterilize the building (at Swiftwater, Pa.), National Drug will use  $\beta$ -propiolactone (BPL), a colorless liquid produced by Celanese

Corp. principally for the synthesis of acrylic acid and acrylates. Use of the material as a sterilant isn't new—the Army has worked with it since the mid-'50s as a gaseous sterilant in antibacterial warfare studies at Ford Detrick (Frederick, Md.). But National Drug will utilize a new method of application that could be a major breakthrough in vapor sterilization.

Wilmot Castle Corp. (Rochester, N.Y.), which has sole rights to distribute BPL as a gaseous sterilant, has developed a machine (cost: \$600) that automatically disperses BPL. The machine, roughly the size and shape of a large rotary lawn mower, allows remote control of vapor spraying, eliminates the need for protective clothing. Converted insecticidal fogging machines are now used in spray operations.

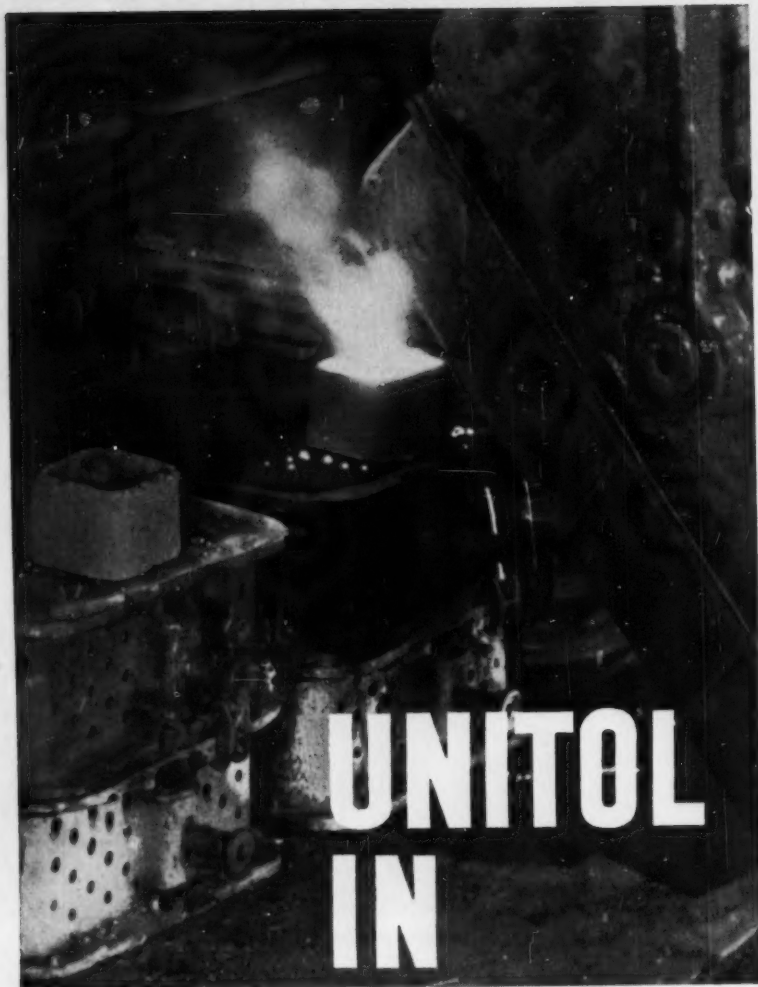
In the new machine, liquid BPL is forced through a high-pressure

nozzle onto a rotating disc; the liquid is vaporized and driven into the air by a large fan under the disc. Temperature, humidity and dispersion-rate may be set at optimum levels.

**Striking at Staph:** At the same time that National Drug is treating its Swiftwater building, a group at Genesee Hospital (Rochester, N.Y.) will be sterilizing its new maternity section, assuring that the area will be clear of *Staphylococcus aureus* and other pathogens which plague hospitals worldwide. In the hospital application, a battery of four machines will be used to spray BPL at the rate of about 350 cc./1,000 cu.ft. The treated areas should be back in use within a few hours.

**Formaldehyde First:** Use of BPL, via the automatic sprayer, marks a big step forward in the use of vapor sterilants to treat large open areas.

Formaldehyde has been used as a



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## SPECIALTIES

gaseous sterilant — released either by heating paraformaldehyde until it sublimed or by dispersing formalin as a fine spray. Though formaldehyde has been used this way since the late 1800s, there are several drawbacks to this method. For one thing, gaseous formaldehyde condenses on dry surfaces as paraformaldehyde, necessitating postspraying wash-downs to prevent irritating formaldehyde fumes.

By replacing formaldehyde with BPL, it's possible to sterilize about five times faster (and at lower temperatures), put the treated areas back into use sooner and with less worry about fumes. (BPL with water forms relatively innocuous  $\beta$ -hydroxypropionic acid, which is easily removed.)

Automatically regulating the dispensing of BPL widens the potential use of gaseous sterilants. Aside from uses in hospitals and research centers, possibilities include the spraying of poultry houses (replacing smoke pots and sulfur dioxide), disinfecting of food processing areas, and spraying of warehouses. The cost of sterilizing with the new material appears to be favorable. Wilmot Castle figures that, with BPL selling for 87¢/lb., cost would be about \$1/1,000 cu.ft. treated.

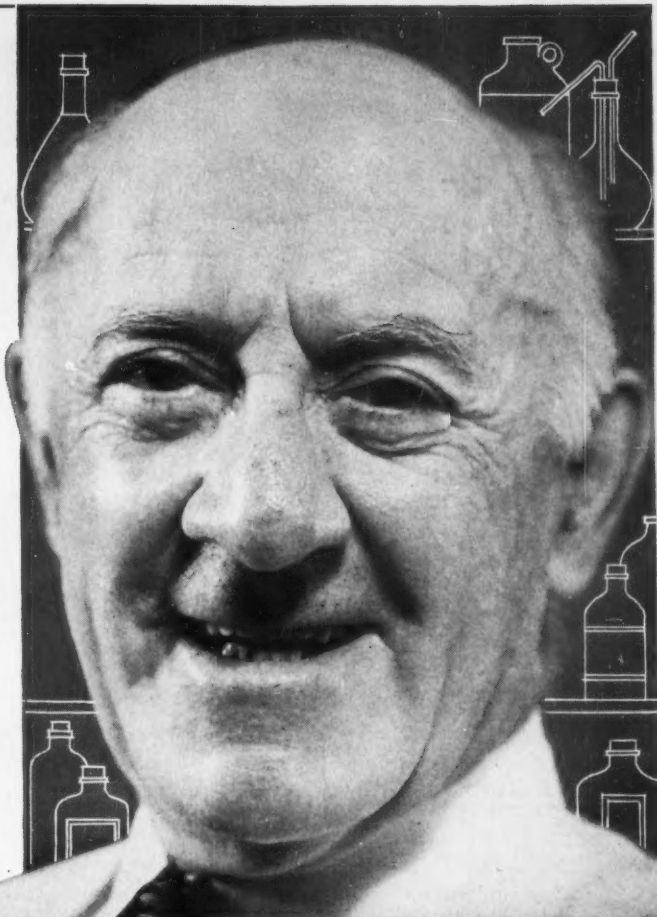
**Inside Job:** Development of the new dispensing equipment for BPL follows the development pattern of another vapor sterilant, ethylene oxide. Until companies such as Wilmot Castle and American Sterilizer developed suitable equipment for dispensing ethylene oxide, effective use of this material was hampered by inability to carefully regulate conditions of time, temperature, pressure and concentration. And since the material is extremely fugitive, the employment of a sealed vessel was necessary to hold it. Its flammability is one of the easiest problems to overcome—by mixing the material with 90% carbon dioxide or 89% of one of the gaseous fluorinated hydrocarbons.

The use of ethylene oxide as a sterilant also isn't new. But with the development of better autoclaves, it's being used more frequently to treat a host of materials.

Certainly one contributor to the growing use of ethylene oxide as a sterilant was the development of intricate medical devices such as artificial kidney and heart-lung oxygenators. Another is the electronics in-

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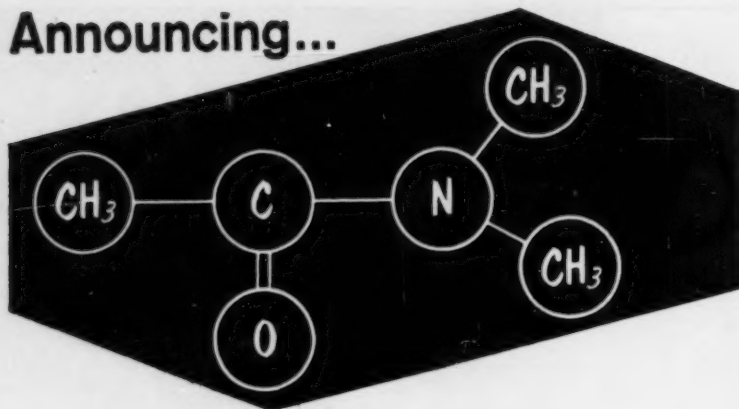
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## SPECIALTIES

dustry, where small sizes and complex shapes make it difficult to sterilize (e.g., to combat mould) other than by gas.

And ethylene oxide's good penetrating power has also won it good markets in treating disposable syringes and other one-use medical items. When packaged, these materials are subjected to ethylene oxide for about eight hours (the slow rate of sterilization is one of ethylene oxide's drawbacks), and they remain sterile until opened.

There's also a future market for ethylene oxide in sterilizing such common household items as toothbrushes, combs and hairbrushes and possibly clothing. Some foods (mainly flour and spices) are already being treated with the material and other food treatment prospects are under study.

**Subs?** Use of propylene oxide as a vapor sterilant has potential, though not much has been done with the material, commercially. It's safer than ethylene oxide in some applications—but it doesn't have ethylene oxide's activity. Another candidate is ethylenimine, which is said to sterilize faster but is more toxic than ethylene oxide.

Using BPL for large exposed areas and ethylene oxide for intricate pieces of equipment or those that require high penetrating power, the researcher has two good vapor sterilants at his command. But these don't exhaust his supply. Steam, for example, is still one of the best sterilants available (where wetting doesn't damage materials)—it's highly unlikely that any other will be found to duplicate its economy or speed.

Ultraviolet light, though not a vapor sterilant, competes with vapors in many applications. Though faster than vapor sterilization in most cases, ultraviolet's penetrating power and area coverage are very small.

Another method of sterilizing is radiation. But it's expensive—\$250,000 or more for an accelerator—probably would be uneconomical unless materials were being sterilized on a continual basis.

**The Future:** The growth of the staph problem in hospitals and continuing interest in virus research, the trend toward use of disposable materials, increased production of intricate electronic shapes, all seem to augur bigger markets for vapor sterilants.

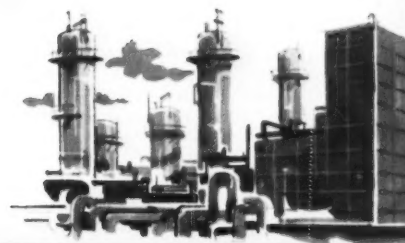


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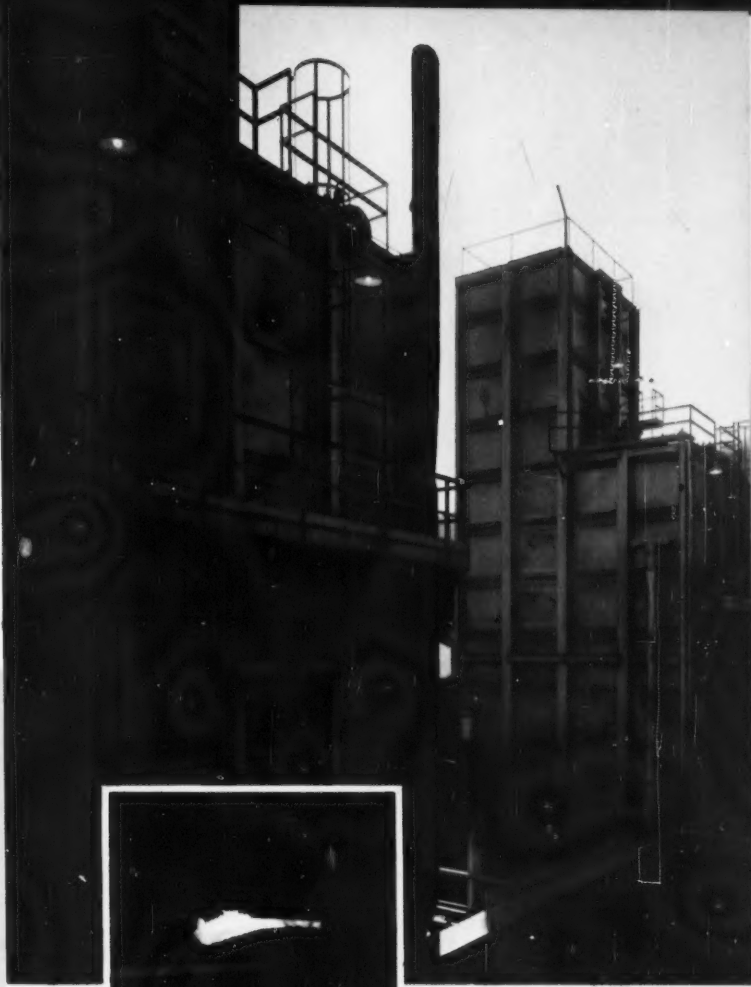
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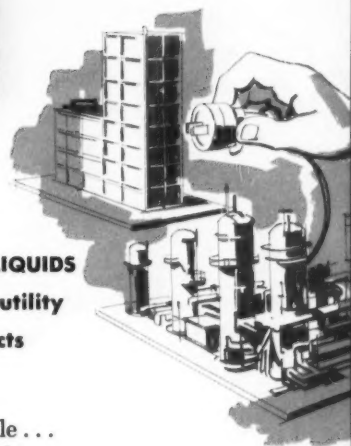
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CW PHOTO—JOAN SYLOW

Picasso and packaging share billing, as a museum discovers . . .

## Packaging: Newest Fine Art

The fine art of specialty packaging went on public display last week in Manhattan. Curators of New York's Museum of Modern Art have discovered—somewhat belatedly—that packaging can be aesthetic as well as functional, so they've arranged an exhibit of what they consider good packaging design. Many of the packages exhibited are for consumer-type chemical specialties.

The two main categories on display are disposable packages (for consumer items, such as toothpaste) and reusable packages (for items used mostly by industry, such as plastic drums). The size and weight of the packages range

from a 1/4-in.-wide roll of water soluble methyl-cellulose film containing tiny seeds (Minnesota Mining and Manufacturing Co., St. Paul), to a 24-ft. collapsible rubber tank that can hold 20 tons of milk (U.S. Rubber Co., Providence, R.I.).

One of the most colorful exhibits is a floor-to-ceiling curtain made of what looks like lengths of large beads. These are multicolored plastic strip packets made by such companies as Unette Corp. (Livingston, N.J.), Nips Co. (Mt. Vernon, N.Y.) and Enko Creations, Inc. (New York), and filled with single-use amounts of specialties such as shampoo, furniture polish,



long dimension of  
lasting quality . . .

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### MODERN FATTY ACIDS

OLEIC—STEARIC—COCONUT—VEGETABLE

A complete line of *distilled*, extremely light colored fatty acids including a brand new product, Wilmar 272 Ester Grade Stearic Acid of high quality and economy—for use in cosmetics, esters and many other applications.

### WILMAR GLYCERYL ESTERS—EMULSIFIERS

GMS GMO GTO GML

Stearates, Oleates and Laurates of Glycerine for food products, cosmetics and industrial applications, including "Hi-Mono" content esters.

### WILMAR ALCOHOL ESTERS—PLASTICIZERS

Butyl Stearate Butyl Oleate  
Propyl Oleate Isopropyl Oleate  
Isopropyl Myristate Isopropyl Palmitate  
Plasticizers

### WILMAR NON-IONICS

Glycol, Polyethylene Glycol, Propylene Glycol Esters. A full line of light colored non-ionic surface active agents from Wilmar fatty acids and glycols.

### WILMAR "WILIMIDS"

A series of nitrogen derivatives of fatty acids with cationic surface activity.



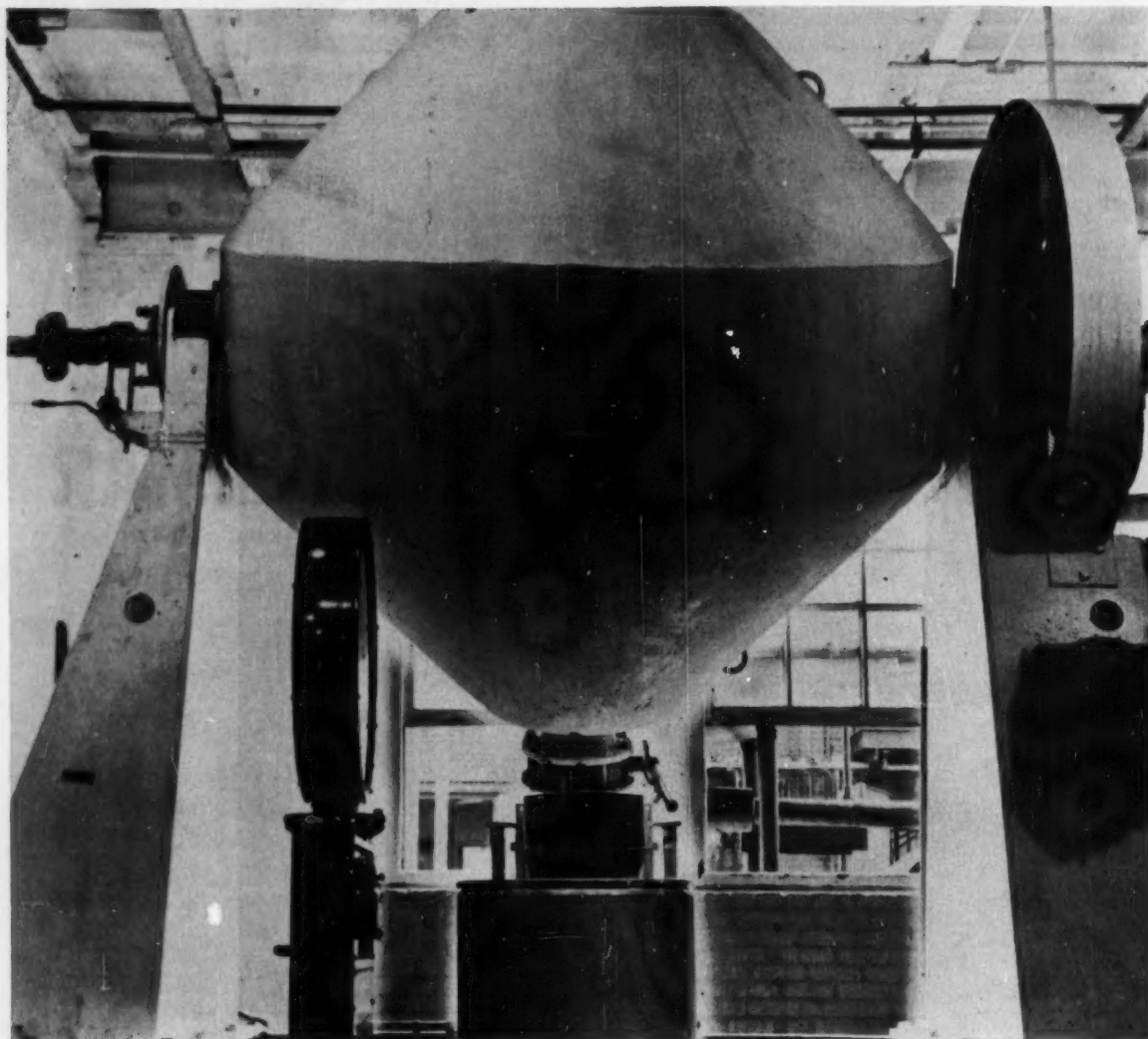
## WILSON-MARTIN



Snyder Ave. & Swanson St., Phila. 48, Pa. ®

Div. of WILSON & CO., Inc.

# FLUIDICS\* AT WORK



## How Merck saves \$6400 a year drying and blending powders

Drying and blending simultaneously in a Pfaudler conical dryer-blender is saving an estimated \$6400 a year for Merck & Co., Inc.

Merck saves 50% in process time alone. The conical dryer-blender turns out the same quality product in a twelve-hour cycle that 120 conventional tray dryers required 24 hours to accomplish. And a separate blending operation was eliminated.

Further savings result from a

sharp decrease in materials handling and saving of pigmented powders previously lost to the process area.

Since the dryer-blender is a closed system, Merck recovers valuable solvent material, also.

**Corrosion-resistant.** This dryer-blender is constructed of Glasteel, so Merck can safely process acidic products without fear of corrosion.

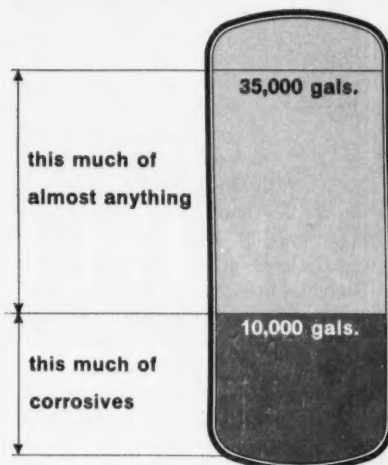
**A whole chemical plant.** You can

use this same unit for impregnating, concentrating, reacting, and coating as well as drying and blending—all in a single operation. Such versatility makes possible tremendous savings in capital investment, process time, floor space, and materials handling.

The conical dryer-blender comes in 2', 4', 6', and 8' I.D. sizes with working capacities from 3 to 165 cu. ft.

Ask for Bulletin 963.

It costs less with Chemstor  
when you store ...



Glasteel Chemstor Tanks actually cost less than stainless steel when you work with volumes between ten and thirty-five thousand gallons ... 50% less in the 30,000-gallon range. These are savings you can pocket today.

It takes a little longer for the savings to show when you're storing less than ten thousand gallons. But the savings are still impressive, especially when you store corrosives. Savings show up in longer service life, because of the almost universal corrosion resistance of Glasteel. Resists all acids (except HF) and mild alkalis.

And in all sizes you have full advantage of Glasteel's ease of cleaning and ability to protect product purity and flavor.

Sizes range from 500 to 35,000 gallons in vertical or horizontal designs with openings to fit your requirements.

A new specification sheet makes it easier for you to order Chemstor Tanks. You can quickly get one of these sheets from your Pfaudler representative. Write in your capacity needs, openings, valving, etc.

The two- and five-thousand-gallon sizes are stocked for 10-day delivery. Request Bulletin 975.

Pfaudler Permutit is a world-wide company with manufacturing plants in:  
 Germany ..... Pfaudler-Werke A.G.  
 Great Britain ..... Enamelled Metal Products Corp. Ltd.  
 Canada ..... Ideal Welding Co. Ltd.  
 Mexico ..... Arteacero-Pfaudler, S.A.  
 Japan ..... Shinko-Pfaudler Co., Ltd.  
 as well as four plants in the U.S.A.



#### FLUIDICS TURNS WASTE INTO PROFIT

### How to side-step a public health hazard ...and step into big new savings

The Homasote Company, Trenton, N. J., makes high-density wood fiber insulation board.

The waste water involved could create a disposal problem and impair the company's good community relations.

The solution? A Permutit Colloidair Separator which turned out to be much more than just a waste treatment system.

**Saves product.** Colloidair "bubbling out" process raises white water fibers to the surface where they are scraped off and reclaimed.

**Saves water.** A closed circuit operation with no water wasted, Colloidair clarifies Homasote's water for re-use in

pump glands, stuffing box seals, and for clean-up.

**Saves heat.** The reclaimed water holds most of its heat during the clarifying process, saves cost of heating for re-use.

**Easy to use.** Colloidair works almost by itself. The operator does little more than periodically charge chemical tanks.

**To solve your fluid waste problem.** The Colloidair Separator can treat a wide variety of waste liquids including oils, paints, fats and greases as well as white waters. We will gladly run a lab and/or pilot plant test to show how the Permutit Colloidair Separator can serve your plant.

Write for the free Colloidair booklet.

#### FLUIDICS AND HEAT TRANSFER

##### Heat Transfer Coefficients for Four Typical Services

	Service Coefficients			
	Btu./(Hr.) (Sq. Ft.) (°F.) and Percentages Referred to Graphite			
	Heating Water With Steam	Condensing Organic Vapor With Water	Cooling Organic Liquid With Water	Cooling Viscous Organic Liquid With Water
Stainless steel tube	184 (92.5%)	79 (96.5%)	43 (100%)	18.9 (100%)
Impervious graphite tube	199 (100%)	82 (100%)	43 (100%)	18.9 (100%)
Glass tube	89 (44.7%)	56 (68.3%)	36 (82.5%)	17.3 (91.6%)
Stainless steel reactor	83 (41.7%)	54 (65.2%)	35 (80.9%)	17.0 (89.9%)
Glassed-steel reactor, pipe	71 (35.7%)	48 (58.5%)	32 (73.8%)	16.3 (86.2%)
Film coefficients only, $h_i + h_o$	300	100	50	20

### Heat transfer through Glasteel higher than most suspect

A recent article in *Chemical Engineering* by Edward J. Ackley, Pfaudler applications engineer, demonstrates an important fact: *you lose little or no heat transfer efficiency when you use Glasteel for service with viscous, corrosive or dirty fluids.*

Mr. Ackley's findings show that over-all coefficients of heat transfer for Glasteel are comparable to those of materials having much higher thermal conductivities.

For example, from the table above, when cooling an organic liquid the service heat transfer coefficient for a Glasteel reactor is 91.3% of that for

a stainless steel vessel. If the liquid is viscous, the coefficients for the two materials are *almost identical*.

If you missed the article, just write for Reprint No. 531. For more information, write to our Pfaudler Division, Dept. CW-99, Rochester 3, N. Y.

\*FLUIDICS is a new Pfaudler Permutit program that provides a modern, imaginative approach for handling and processing liquids and gases more profitably.



## PFAUDLER PERMUTIT INC.

Specialists in FLUIDICS ... the science of fluid processes





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We mine Copper, Iron, Zinc and Sulfur and are basic producers of their chemical derivatives. Our technical know-how in these basic materials is your assurance of exacting quality control and strict uniform consistency.

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**Copper Sulfate** Industrial Crystals and all common grades.

**Monohydrated Copper Sulfate** 35% Copper as metallic packaged in steel drums at no extra cost.

**Copper Carbonate** 55% Copper as metallic. Light and dense grades.

**Cupric Chloride** 37% Copper as metallic. Available in polyethylene lined drums or bags.

### SULFUR ←-----

**Sulfuric Acid** All grades and strengths from 60° Baume through the various Oleums.

**Liquid Sulfur Dioxide** Highest commercial quality, available in tank cars, tank wagons, ton cylinders and 150-lb. cylinders.

**Sodium Hydrosulfite** T-C HYDRO is a dry, white, free flowing crystalline powder of uniform particle size and structure. It is dust free, assuring highest stability and uniformity.

**Chlorosulfonic Acid** Iron less than 1.0 ppm as loaded. Water White. Delivered in glass-lined tank wagons, also in stainless steel drums.

**Para Toluene Sulfonic Acid, Anhydrous** Other organic Sulfonic Acids.

### IRON ←-----

**Ferric Iron Sulfate** Partially hydrated free flowing granular. Available in bags or bulk.

### ZINC ←-----

**Monohydrated Zinc Sulfate** 36% Zinc as metallic. White, free flowing powder.

**Zinc Oxide** Secondary.

### MANGANESE ←-----

**Manganese Sulfate** Fertilizer Grade

**Monohydrated Manganese Sulfate** 93% Mn, SO<sub>4</sub>, H<sub>2</sub>O. Highest purity, technical grade . . . NOT A BY-PRODUCT.

**Manganous Oxide** Minimum 48% Manganese as metallic. Feeds; fertilizers, spray or dust grades.



**TENNESSEE CORPORATION**

617-29 Grant Building, Atlanta, Georgia

## SPECIALTIES

wax, perfume and pharmaceuticals.

**Pharmaceutical Packaging:** Many designs for packaging drugs and medicinal supplies showed up in the exhibit. For instance, Odol Chemical Corp. (New York) has a mouthwash bottle of white milk-glass with the spout on the side. Band-Aid adhesive tape is being shown in a rigid plastic dispenser by Johnson & Johnson (New Brunswick, N.J.). Aspirins have a new look in an orange plastic box by E. R. Squibb & Sons (New York). Other pill dispensers on view were made by Abbott Laboratories (North Chicago, Ill.), Smith-Dorsey Pharmaceuticals (Lincoln, Neb.) and Burroughs Wellcome (Tuckahoe, N.Y.).

**Industrial Packaging:** Standard Plastics, Inc.'s (Fogelsville, Pa.), molded urethane foam package, "Stan-foam," for delicate aircraft instruments and electronic tubes is shown, as are polystyrene electric light bulb packages made by Koppers Co., Inc. (Pittsburgh, Pa.).

Other instances of new plastic packaging are a polystyrene pack for poker chips by Maryland Plastics, Inc. (Federalsburg, Md.), and a polyethylene tray for golf balls by Pyro Plastics Corp. (Union, N.J.).

Though the museum's efforts have been well intentioned—and welcome—many things have been left out of the show that curators could have picked up by strolling casually down the aisle of any self-service supermarket or drugstore. Aerosol products are notably lacking from the exhibit, and few if any tear-strip packages are on display.

### Aerosol Orange Drink

**Tropicana Products** (Bradenton, Fla.) will soon go national with a nitrogen-propelled aerosol orange drink concentrate. The product, called Tropicana Instant Orange Drink, is sold in a 16-oz. can (contents 9½ oz.) for 49¢. The concentrate needs no refrigeration.

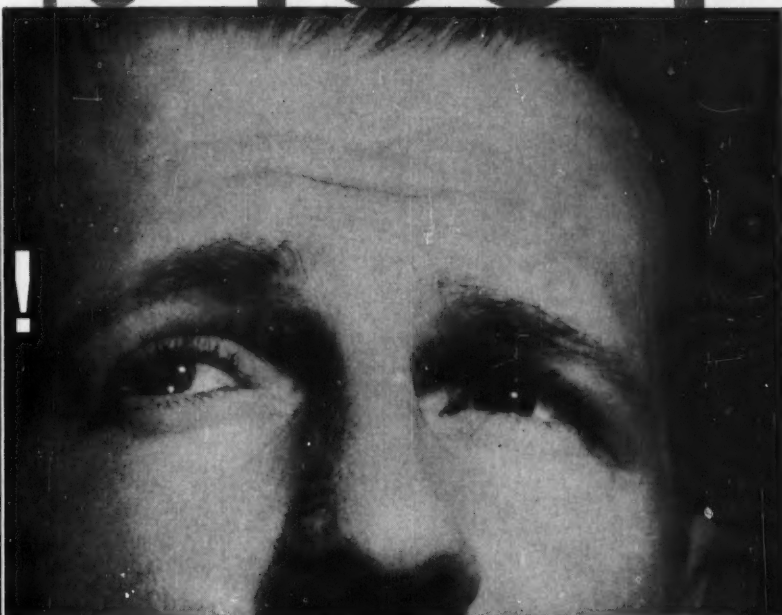
The solids content of the drink is made up of 40% orange concentrate, plus sugar, citric acid, sodium citrate, vitamin C, artificial coloring and sodium benzoate. The 16-oz. can is said to make 20 four-ounce glasses of orange drink. The company also plans to market aerosol-packaged lemonade, limeade, grapefruit, and pineapple-grapefruit drinks.



# 267°<sub>TO</sub> 400°F

**THINK!**  
how you  
can use  
this

high-  
melting



# WAX

WAX	TYPICAL MELTING POINT IN DEGREES F	DESCRIPTION
267 Wax	267	Tan, opaque, moderately brittle, and does not warp or shrink upon cooling.
272 Wax	272	Yellow-tan, waxy, and does not warp or shrink upon cooling.
315 Wax	315	Tan, opaque and waxy.
325 Wax	325	Tan and waxy.
335 Wax	335	Tan, opaque, waxy, and does not shrink upon cooling.
350-A Wax	350*	Yellow-tan, translucent, brittle, and somewhat plastic.
350 Wax	350*	Dark tan, opaque, and very brittle.
400 Wax	400*	Beige-tan, opaque, and very brittle.

\*Solidification Points

...in such applications as insulating materials, chemical-protective coatings, asphaltic compounds, tars, metal-drawing compounds, and electrical potting and dipping waxes.

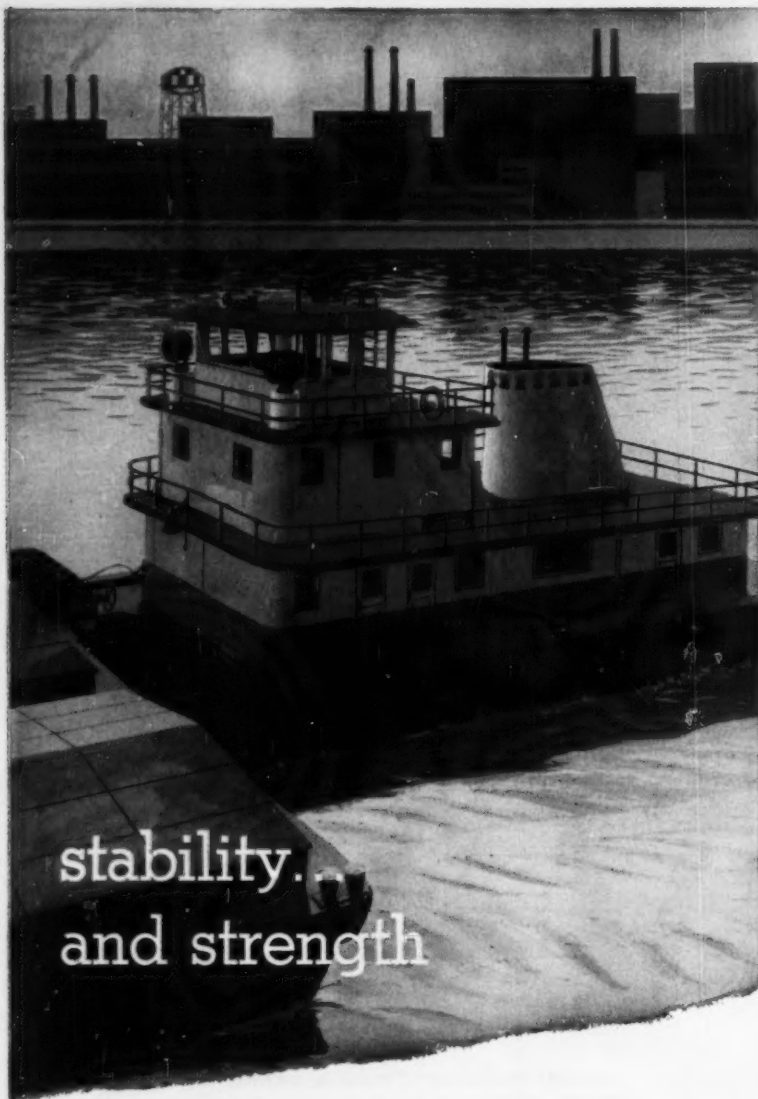
Carlisle was the first to develop synthetic waxes in the 350°F. to 400°F. melting point range. Since their introduction several months ago, interest shown by those who specify, buy, or influence buying, denote these waxes have an extremely promising potential in a variety of industries.

For a possible answer to your search for a suitable wax, study carefully the description of unique physical and chemical properties. All waxes available in finely beaded form in any quantity. Samples and data sheets will be sent if you'll indicate those waxes of interest to you. Write to Dept. W-1



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**CHEMICAL WORKS, INC.**  
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ADVANCE SOLVENTS & CHEMICAL DIVISION, NEW BRUNSWICK, N. J.  
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stability...  
and strength

## piccolastic resins

Chemically inert and color stable, the PICCOLASTIC Resins combine toughness with outstanding water and chemical resistance.



*The trademark of quality*

**PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION**  
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### SPECIALTIES

#### Cosmetics Merger

Another cosmetic company combination entered the hair coloring field this week with Shulton, Inc.'s (Clifton, N.J.), purchase of Tecnique, Inc. (Minneapolis, Minn.). The transaction was reported to be an outright cash purchase but the amount of the sale was not disclosed.

Tecnique manufactures Color-Tone, a hair colorant distributed nationally in most key markets. It is retailed through department stores, independent and chain drugstores, and distributed also for professional use in beauty salons.

The company will continue its operations, supplemented by the research, marketing, manufacturing, and sales facilities of Shulton. Sig Pass will stay on as president of Tecnique, Inc., which will operate as a subsidiary of Shulton, Inc.

Entrance into the hair colorant field by Shulton closely follows the move, a few weeks ago, of Revlon, Inc. (New York), which acquired Bressard Hair Products, Inc. (New York). Bressard manufactures and distributes hair coloring and conditioning products to beauty shops. Its products are not retailed.

Shulton's entry, the probable move of Revlon into retail markets and several other large companies' work on colorants means that the \$42-million/-year home colorant market is in for some brisk competitive marketing.

#### Paint from Peelings

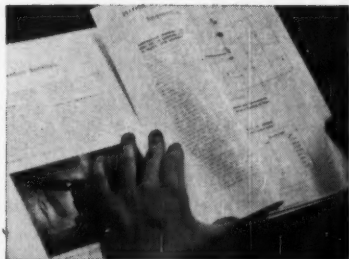
Florida Citrus Mutual, a growers group in Lakeland, is a great believer in oranges. It plans to paint its headquarters building with a new coating made from citrus peel oil.

Matthew Taggart, director of research for the O'Brien Corp. (101 North Johnson St., South Bend, Ind.), perfected the oil-base paint, in which orange peel is used as part of the vehicle. The oil is extracted from the peel by conventional steam distillation. And Taggart told *CW* the paint smells like oranges for the first 24 hours after application.

So far, O'Brien has made a 1,000-gal. batch and it's available for \$6.75/gal. But the company will consider the paint experimental until it finds a more economical way of extracting the oil from the citrus peel.

# BRIEFS

on an engineering and handling guide for caustic soda... caustic soda economics... chlorine demand and supply... flexible buying possibilities for carbonate of potash



## Fact-packed guidebook on CAUSTIC SODA

Here are 40 pages of facts to help you save money on your caustic soda operation.

They tell how to store liquid caustic soda safely and with a minimum of handling problems.

Detailed diagrams and pictures show the best recommended methods to use. Clear instructions give tested ways to unload, dilute, pipe, and store.

Nearly 20 graphs and tables describe the physical behavior of liquid caustic soda under a wide range of working conditions.

## NIALK® K<sub>2</sub>CO<sub>3</sub> is almost custom made

You have seven forms to choose from

- Hydrate, Regular 83.5-84%
- Calcined, Regular 99.2-99.6%
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- Powder 91-94%
- Liquid 47-52%

Therefore, you can gear your buying to your process or product needs.

You can select from six kinds of containers. Hydrate and calcined come in wooden barrels, paper bags, and fiber kegs. 99% powder comes in barrels, fiber kegs, and paper bags, while 91-94% powder is in barrels and bags. You can get liquid in steel drums, tank wagons, and tank cars.

Thus, you can fit your containers into your inventory, warehousing, or processing requirements.

The advantages of this wide choice are obvious. Another is getting a carbonate of potash free from iron and chlorate impurities.

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Chlorine's great usefulness to man has created a pushing demand for this chemical in a large number of industries.

Its uses grow and grow.

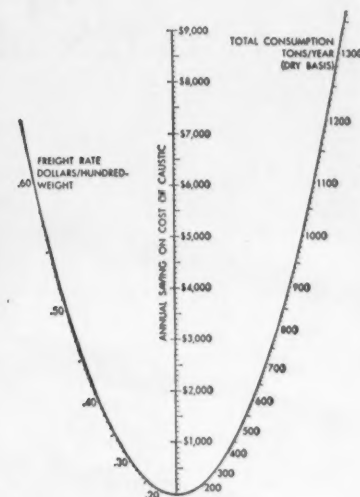
But so, happily, does the production of chlorine. Three Hooker plants—in Niagara Falls, Tacoma, and Montague, Michigan—and the Hooker Type "S" electrolytic cells help meet the country's big demand.

You do not have to wait for delivery on Hooker chlorine. Order a ton container or a tank car—delivery is dependable and fast. And you get a high-quality product in carefully maintained containers.

For more information, check the coupon.

## 50% caustic soda...or 73% Which is the better buy?

A fast way to find out which buy is better for you is to use the nomograph below.



Draw a straight line from your freight rate to your yearly orders in tons. Then read the figure where this line crosses the line of annual savings. This is your saving on 73% before you take out the cost of using the equipment for diluting to 50% while unloading, or of nickel-clad tanks for storing 73%.

To get cost data for this equipment, call in your Hooker man. He will be glad to help you figure it.

For more information on the chemicals mentioned, check here:

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|---|---|
| <input type="checkbox"/> Caustic Soda Engineering and Handling Guide  | <input type="checkbox"/> Hooker Chlorine Manual         |
| <input type="checkbox"/> Nialk Carbonate of Potash and Caustic Potash | <input type="checkbox"/> Caustic Soda Data Sheet        |
|   | <input type="checkbox"/> Carbonate of Potash Data Sheet |

Clip and mail with your name, title and company address. Use business letterhead when requesting samples.

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# Aluminum Electrical Equipment

Serves Longer with Less Upkeep  
in Chemical  
Process  
Installations

Aluminum Bus weighs less, costs less than equivalent copper systems. Installation is easier, less costly—and maintenance is lower because Reynolds Aluminum resists corrosion, won't rust.

The Finest Products  
Made with Aluminum

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REYNOLDS  ALUMINUM

Equipment made with aluminum serves longer with less attention, looks new longer with less protection. Aluminum conductors are much lower in cost than copper conductors with the same current-carrying capacity. Aluminum won't rust, and it resists corrosion. It's the *lowest-cost* corrosion resistant metal.

These are the big reasons more and more electrical equipment is made with Reynolds Aluminum—and why this equipment is preferred for chemical processing installations.

And there are other reasons, just as important. Equipment and conductors made with aluminum are easier to handle, easier to install. Aluminum is about one-third the weight of steel, or copper.

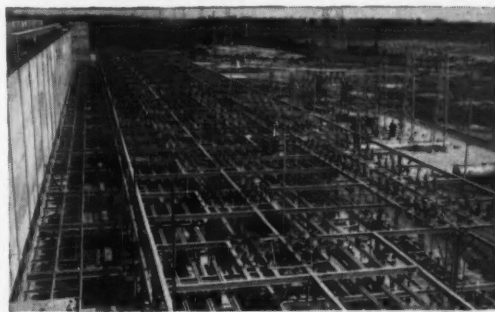
Aluminum's electrical properties can improve the performance of your electrical systems, too. Aluminum conductors often carry more current, and have excellent thermal conductivity, as well. Voltage drop may be lower with aluminum, and aluminum is non-magnetic, non-sparking.

For an electrical system or electrical equipment that will perform better, require less maintenance, and cost to install, specify conductors and equipment made with Reynolds Aluminum for the following applications . . . substations (structural members and conductors), wire and cable, cable trays and interlocked armored cable (sheathing and conductor), bus duct systems, bus bar or tube (available silver plated or bare), rigid conduit, metal enclosed switch gear. And you'll find tough, corrosion-resistant Reynolds Aluminum can cut your costs and improve plant appearance in a wide range of chemical and petroleum processing applications: jacketing, heat exchangers, tanks and vessels, piping, even drilling equipment.

Contact your local Reynolds branch office for details, or write *Reynolds Metals Company, P.O. Box 2346-CM, Richmond 18, Virginia.*



**Aluminum Rigid Conduit** is now competitive with steel in initial cost, and lower in installed cost. 10 ft. length, 3 in. size, weighs just 27 lbs., compared with 69 lbs. for steel. It's non-magnetic, non-sparking, non-rusting.



**Aluminum Structurals** are ideal for chemical processing substations. Their light weight cuts installation time, their corrosion-resistance adds years of service.



**Interlocked Armor Cables and Cable Trays** made with aluminum can be installed much faster than equivalent steel systems. Corrosion-resistant, non-magnetic, as well.

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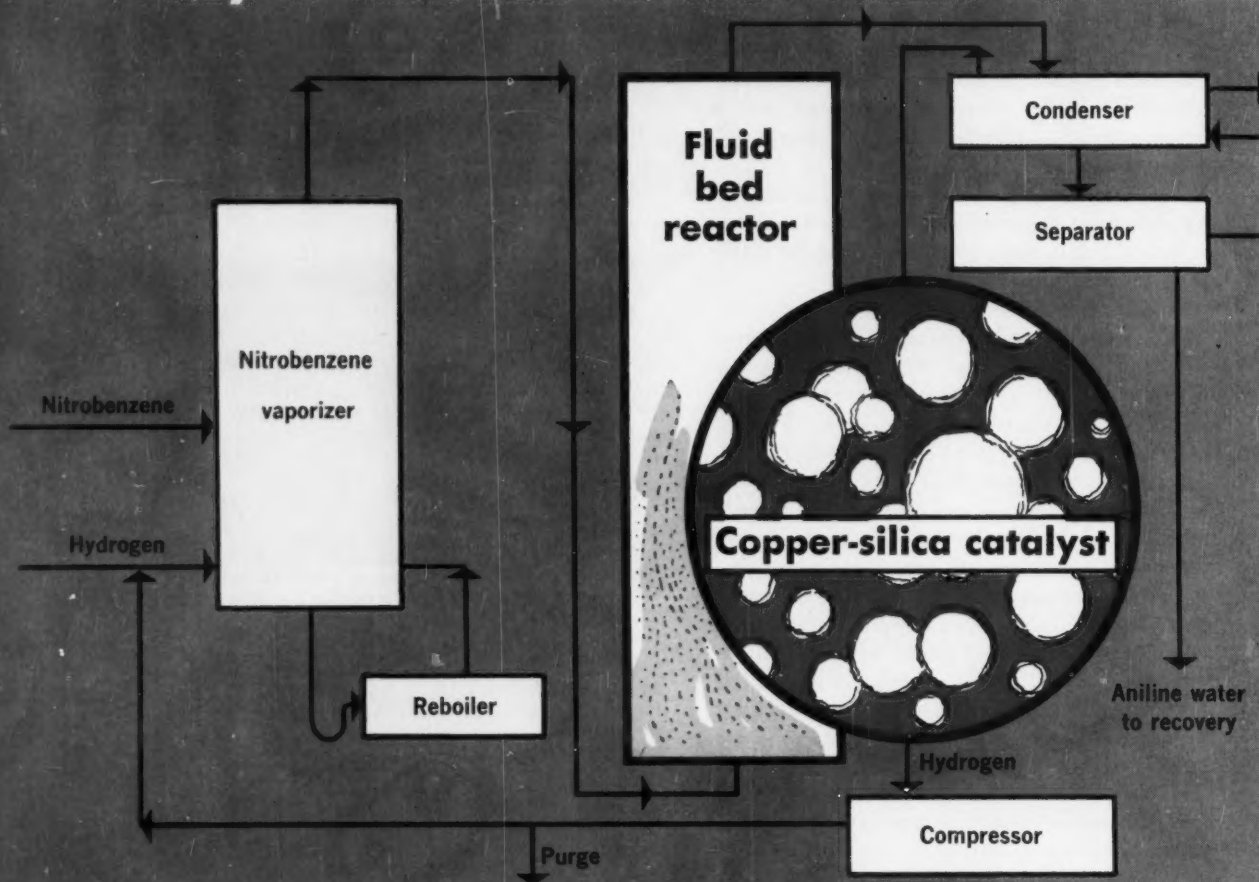
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## Key to Fluid-Bed Aniline Process: New Form



## Fluid-Bed Catalyst—Solid Base for

American Cyanamid Co.'s 1½-year-old aniline plant at Willow Island, W. Va., is operating this week above its rated capacity of 24 million lbs./year, thanks to the demand for the pure product made by its fluid-bed catalytic reduction process. Key to the route: manufacture of the catalyst, revealed for the first time in the company's recent patent (U.S. 2,891,094).

The new catalyst—copper on silica, prepared by a careful series of steps—offers several advantages:

- Fluidized action, with subsequent ease of operation, is made possible by small particle size (20-150 microns) and good mechanical properties.
- High initial life allows produc-

tion of 1,500 parts of aniline per part of catalyst before regeneration is required.

- Ease and effectiveness of regeneration extends ultimate catalyst life to several times the initial life.
- Single-pass conversion into aniline is nearly quantitative, exceeding 99% in the reactor, 98% in the over-all operation.
- Inexpensive catalyst starting materials and procedures assure an economical material.

According to Cyanamid, past attempts at making a copper catalyst have fallen short in one or more of these areas. Several decades ago, for instance, I. G. Farben used a catalyst of copper baked onto silica, but this

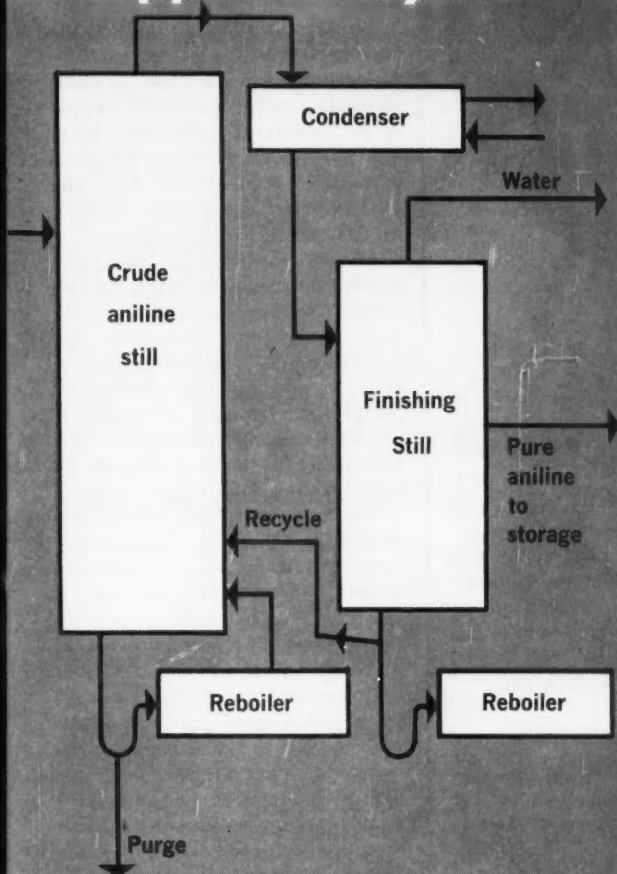
form could not be fluidized.

**Competing Methods:** Allied's National Aniline Division, which pioneered catalytic vapor-phase reduction of nitrobenzene at its Moundsville, O., plant in '54, doesn't use copper, instead has a patent (U.S. 2,716,135) that describes a catalyst of nickel sulfide and amorphous alumina. It's a fixed-bed method, requiring several reactors with cooling between stages to remove the high heat of reaction. The patent claims a conversion rate of over 99%.

Du Pont, too, is switching to the catalytic reduction route. Details of its process aren't available, but the company will use the catalytic route at its new Gibbstown, N.J., plant,



## of Copper Catalyst



### OTHER ANILINE ROUTES:

1. Iron reduction of nitrobenzene—used by Du Pont, Cyanamid and others.
2. Fixed-bed catalytic reduction of nitrobenzene—used by Allied.
3. Ammonolysis of chlorobenzene — used by Dow.

**COPPER-SILICA CATALYST** is a small-diameter, high-strength material made by a closely controlled method. Vapor-phase reduction of nitrobenzene takes place in a single fluid-bed reactor in about one minute.

## Boosting Aniline Output Efficiency

which is nearing completion. The conventional method—liquid-phase reduction of nitrobenzene with iron borings and hydrochloric acid—is still in use at Gibbstown, at Cyanamid's Bound Brook, N.J., plant, and at plants of captive producers.

Several factors have prompted the trend away from the iron borings route. For one, conversion rate is lower (about 95%) compared with 98-99% for the vapor-phase method. But the limiting factor is the availability of iron borings. A small-scale operation can be carried on with locally available borings, but a large aniline plant would require so much iron that transportation would be a major expense.

Tennessee Eastman went into operation at Kingsport, Tenn., about a year and a half ago, with a method of its own. As yet, there's been no revelation whether this method is a catalytic nitrobenzene reduction or some other approach.

Another venerable route, used by Dow at Midland, Mich., is ammonolysis of chlorobenzene. Main problem is the suppression of competing reactions, principally those that lead to phenol or diphenylamine. However, in spite of textbook assertions that conversion into aniline by this route is only 85-90%, Dow says it's getting 98.4% conversion in the reaction, and an over-all yield of 96%. Attraction of the route for Dow is the com-

pany's plentiful supply of chlorine. But it won't comment on plans for trying other methods.

**Critical Catalyst:** Success of the Cyanamid process hinges on careful production of the catalyst used. In its final form, the catalyst is metallic copper on silica, but several closely controlled steps go into achieving this form.

First step is the production of a silicic acid hydrogel (colloidal silica suspended in a water gel) by acidifying a solution of sodium silicate in such a manner as to maximize the surface area of the silica particles. The hydrogel is mixed with a cuprammonium compound formed by dissolving a copper salt in enough aqueous am-



# WORLD STANDARD FOR SAFETY

## in process safety-relief valves

From the Near East to our own Far West . . . the name Farris on safety-relief valves has been a standard synonym for safety since 1943. The patented design features on all Farris full-nozzle valves combine to offer the ideal concept of a trouble-free, 100% safe safety-relief valve for every application.

### SERIES 2600

The most popular top-guided, self-aligning, safety-relief valve for process piping service. Maximum pressure, 150 to 2500 psig, RF/RJ. Plain or Lever types. Standard or BalanSeal bellows construction.

### SERIES 2740

A cast-steel relief valve of simplified design for use where extreme blow down accuracy is not essential, but where durability, compactness are. Pressures to 3500 psig at 450°F; 2000 psig at 800°F. Sizes ½" to 2".

### SERIES 2745

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## ENGINEERING

monia to bring the pH to 9-10. More or less alkalinity would have severely adverse effects on the properties of the finished catalyst.

Another important variable in the impregnation step is the ratio of copper to silica in the mixture. In order to obtain a minimum of 5% copper in the catalyst, this ratio must be at least 0.085 parts of copper per gram of silica. A ratio between 0.1:1 and 0.5:1 results in the best catalyst, which contains 10-20% copper.

After the hydrogel has been thoroughly impregnated with the cuprammonium compound, the slurry is filtered, washed and spray-dried. The dry product is activated in the reactor to give the final catalyst by calcining in a hydrogen atmosphere at 250 C. Calcining converts the mixture into copper oxide and silica; hydrogen reduces the copper oxide.

Specifications of the finished catalyst are as follows: particle diameter from 20-150 microns; surface area above 200 sq. m./g.; pore volume above 0.25 cc./g.; average pore diameter above 20 Angstrom units.

**Process Operation:** In addition to hydrogen, feed material for the process is nitrobenzene, made by nitrating benzene that contains less than 10 ppm. of thiophene. (The low thiophene level is important because of sulfur's poisoning action on copper catalysts.) Vaporized nitrobenzene and a three-fold excess of hydrogen are fed into the bottom of a bubble-tray tower containing the catalyst.

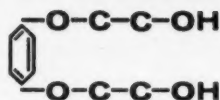
The mixed gases pass upward through a porous distributor plate into the fluidized catalyst bed. Traveling at a rate of about 1 ft./second, gas mixture reacts in 0.5-100 seconds before passing out of the top of the reactor. Sufficient head-room is left in the vessel for most of the entrained catalyst particles to fall back into the reaction zone.

The process is carried out at about 270 C and 20 psig. Excess heat from the exothermic reaction is removed by a heat-transfer liquid that is circulated through tube bundles suspended in the catalyst bed.

Exit gases are filtered free of catalyst on porous stainless steel filters and condensed. Hydrogen is recycled, while aniline and water are separated by decanting. The crude aniline contains less than 0.5% unreacted nitrobenzene and about 5% water. One

# Eastman Briefs

## FOR SEPTEMBER



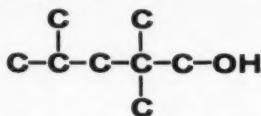
### Hydroquinone $\beta$ -Hydroxyethyl Ether

Form ..... solid  
Melting point ..... 101-102°C.  
Boiling point, 0.3 mm. .... 190-200°C.  
Hydroxyl number, mg. KOH/g ..... 555-565

This unusual ether is a natural for new and interesting polyesters. Try it. Ours had excellent flexibility, hardness, and heat resistance.

**Eastman Chemical Products, Inc.**  
Kingsport, Tennessee

B8



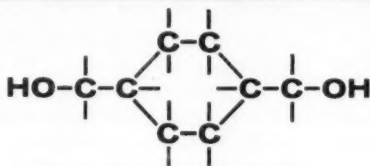
### 2,2,4-Trimethylpentanol

Form ..... liquid  
Specific gravity, 20°C. .... 0.8296  
Boiling point, 760 mm. .... 166-168°C.  
Purity, % ..... 98-99

The business end of this alcohol offers a promising reaction site for building heat-stable esters with lube base possibilities. Note the absence of beta-hydrogen atoms.

**Eastman Chemical Products, Inc.**  
Kingsport, Tennessee

B9



### 1,4-Cyclohexanedimethanol

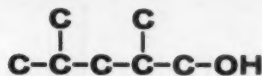
Form\* ..... solid  
Melting point ..... 41-61°C.  
Isomer composition ..... 30% cis; 70% trans  
Purity, % ..... 99

Looks like everybody's got a new diol or two to dangle before chemists working with polyesters or urethane elastomers. Here's our latest candidate. Consider that rigid ring for instance!

\*Supplied as 70% solution in methanol

**Eastman Chemical Products, Inc.**  
Kingsport, Tennessee

B11



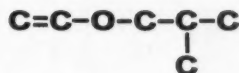
### 2,4-Dimethylpentanol

Form ..... liquid  
Specific gravity, 20°C. .... 0.8201  
Boiling point, 760 mm. .... 158.5-161°C.  
Color, APHA ..... <5

The structural formula of this seven carbon alcohol pretty much tells the story. It's a high boiling solvent—forms esters with properties intermediate between those of butyls and octyls—and we can make it in volume.

**Eastman Chemical Products, Inc.**  
Kingsport, Tennessee

B12



### Vinyl Isobutyl Ether

Form ..... liquid  
Specific gravity, 20°C. .... 0.7687  
Boiling point, 760 mm. .... 82.9-83.2°C.  
Purity, % ..... 98.7

Here's reactivity with a hook to it (isobutyl hook, that is). Readily polymerizes with styrene, vinyl esters, maleic anhydride, acrylic compounds and many other vinyl monomers.

**Eastman Chemical Products, Inc.**  
Kingsport, Tennessee

B13

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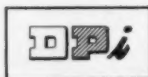
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## ENGINEERING

distillation removes high-boiling residues; another produces finished aniline with a minimum freezing point of  $-6.2^{\circ}\text{C}$ .

Need for catalyst regeneration is indicated by an increasing nitrobenzene content in the crude aniline. Regeneration is carried out in two steps. First, the system is flushed with an inert gas followed by air. At  $250^{\circ}\text{C}$ , the organic material deposited on the catalyst burns off. In the second step, hydrogen is passed through the system to reduce any copper that was converted into the oxide by air in the previous step.

With more than a year of commercial operation under its belt, Cyanamid is in a good position to assess the potentialities of its process. Although aniline consumption to date this year indicates a new record year (above '55's 132 million lbs.), installed capacity is sufficiently higher than foreseeable demand to give a real competitive edge to the process that can prove its advantage.

### Information Upgrading

Information useful in true engineering control—rather than a catalog of past events—will become increasingly available as fact storing and finding methods become more advanced. That was the message of Du Pont's John Sayer, speaking in Los Angeles last week at the seventh annual engineering management conference sponsored by the American Institute of Chemical Engineers and six other engineering societies.

Sayer noted that there are about 500 periodicals in the U.S. and Canada alone that carry information of potential interest to chemical engineers. And he estimates that as much as 15% of a company's technical effort is spent looking for information that's known to exist somewhere.

The two-step solution he proposes for upgrading information consists of (1) improving available information by storing it better, keeping it up-to-date and making it more readily accessible, and (2) devising better ways of using the information once it's obtained.

**Improved Information:** Best way to handle information is to store it by "concept coordination" methods (those that pinpoint the desired information by including it—in code

form—in a number of categories) as opposed to simple alphabetic or single-concept systems (e.g., Dewey decimal system). Examples of improved systems are manually searched punched cards or computer-searched magnetic tapes.

Du Pont's experience with such a system has shown that it gives twice as much information per reference question as conventional plans, answers 33% more questions and retrieves less than 5% nonpertinent information.

**Rigorous Use:** Once obtained, information must be manipulated rigorously to achieve best control, declared Sayer. A technique used at Du Pont, called the "arrow convention," was given as an example of one way in which data might be used in controlling engineering operations. This is essentially a three-step method of determining optimum job sequences for completing a given project in varying periods of time.

In the first step, the sequence and relationships of each job in the project are shown graphically by a network of arrows. (Large, complex projects can be outlined in this way on a sheet of paper.) Then, time factors are introduced to determine the most time-consuming sequence of jobs (which becomes the total limiting time factor on the project). Finally, large-scale computer methods are utilized to work out an economically optimum job sequence for any given total time interval.

### Gasoline Bricks

**Details of the Russian process** for solidifying gasoline (*CW*, Oct. 4, '58, p. 90) have finally sifted through the Iron Curtain. The fuel-briquetting method was developed by V. I. Losev of the Institute of Fuels at the U.S.S.R. Academy of Sciences to provide a storable form of gasoline that can be transported without the need for tank cars.

Key to the solidification process: formation and stabilization of an emulsifying solution that hardens into a fine-celled, honey-combed structure containing about 95% gasoline.

First step in the brick-making process is the preparation of the emulsion-forming material—ammonium chloride, casein, polyvinyl alcohol, glycerine and distilled water. This mixture



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Numerous refinements have been contributed to the process by Badger. These include new purification techniques, better reactor design (including more efficient heat removal), improved condensing and recovery sections for effluent gases. The process has these advantages over conventional fixed bed methods: *Low capital and operating costs* — smaller, simpler equipment saves 20% or more on plant investment, cuts utility and operating labor costs up to 30%. *Better yield* — process converts 5-10% more of feed naphthalene to phthalic anhydride. *Flexibility* —

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With the process Badger offers unmatched engineering, construction and operating experience . . . gained in working with Sherwin-Williams . . . from the design and engineering of two current phthalic anhydride projects (see right) . . . through a broad background in fluid bed processes in general. It's as simple as this: when you are considering new phthalic anhydride facilities, come to Badger for the answers. Write or call Badger Manufacturing Company, 363 Third Street, Cambridge 42, Massachusetts.

### Two major phthalic anhydride projects current at Badger

At Elizabeth, N. J., Badger is constructing a 30 million lb/yr phthalic anhydride plant for Reichhold Chemicals, Inc. When completed in late 1959, it will produce about 16% of U. S. production of phthalic anhydride made from naphthalene.

Another fluid bed plant, similar in design and capacity to RCI's, is being handled for ACNA (a subsidiary of the Montecatini group) in Milan, Italy. This plant is also scheduled to go on-stream in 1959.

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## ENGINEERING

is fed into a reaction vessel, where the gasoline is added and thoroughly emulsified by the combined action of mechanical stirring and ultrasonic dispersion.

Following five to six minutes in the reactor, the gasoline emulsion is transferred to a hardening tank together with a 20% formaldehyde solution. Oxalic acid is then added to the batch and the mixture is stirred until it attains a high viscosity. The viscous mass is finally extruded into long strands, which are later cut into bricks and dried.

In its finished form, the solid fuel consists of tiny cells (0.05-0.005 mm.) of a liquid-gasoline "inner phase," surrounded by the hardened plastic emulsifier "outer phase." Stabilization of this outer phase proved to be a tricky problem, since the stabilizing agent largely determines the physical properties of the bricks. The casein-formaldehyde combination finally solved this problem, but polyvinyl alcohol had to be added to reduce the brittleness of the bricks. The product is said to be resistant to water and weather and can be stored under widely varying temperature conditions (-60 to 50 C).

Regeneration of the solid fuel into liquid gasoline is accomplished by a specially designed press, which squeezes the liquid out of the honey-combed cell structure. Regeneration losses of gasoline are reportedly only 2-3%. The bricks may also be burned as solid—10 grams of the material is said to provide enough heat to raise one liter of cold water to the boiling point.

## PROCESSES

**Fatty Acids:** The oily by-product obtained in the oxo synthesis of aldehydes can be converted into fatty acids, according to a German patent application (DAS 1,061,770) of Farbwerke Hoechst AG. (Frankfort/Main). The oil residue, obtained after distillation of the main products of the synthesis, is pressed through a 50% solution of caustic soda at 300 C and 100-150 atm. After two hours, the leached material is diluted with water; a layer of oil is separated from the aqueous layer, which is acidified with sulfuric acid. The fatty acid is isolated by distillation. Typical yield from the by-product of the oxo synthesis of pro-

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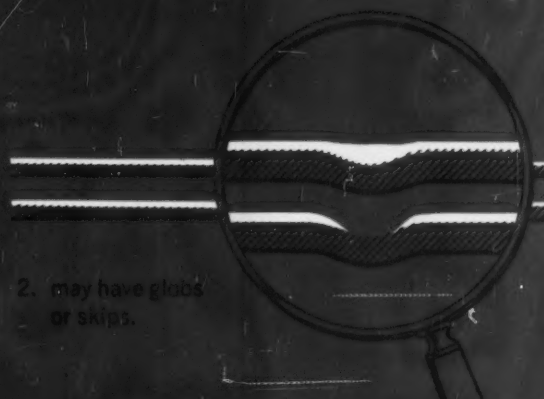


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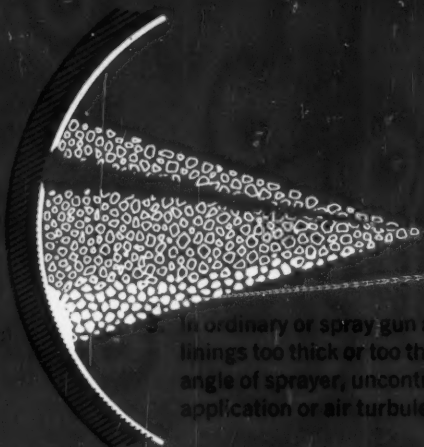




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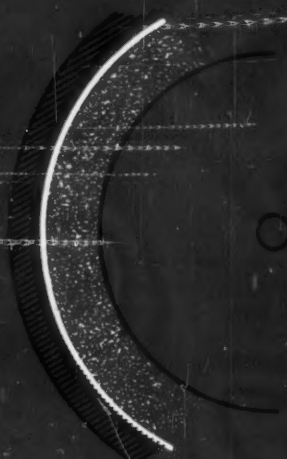
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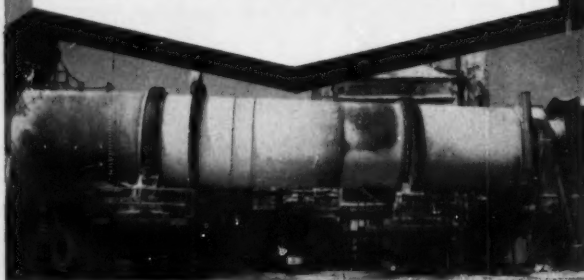




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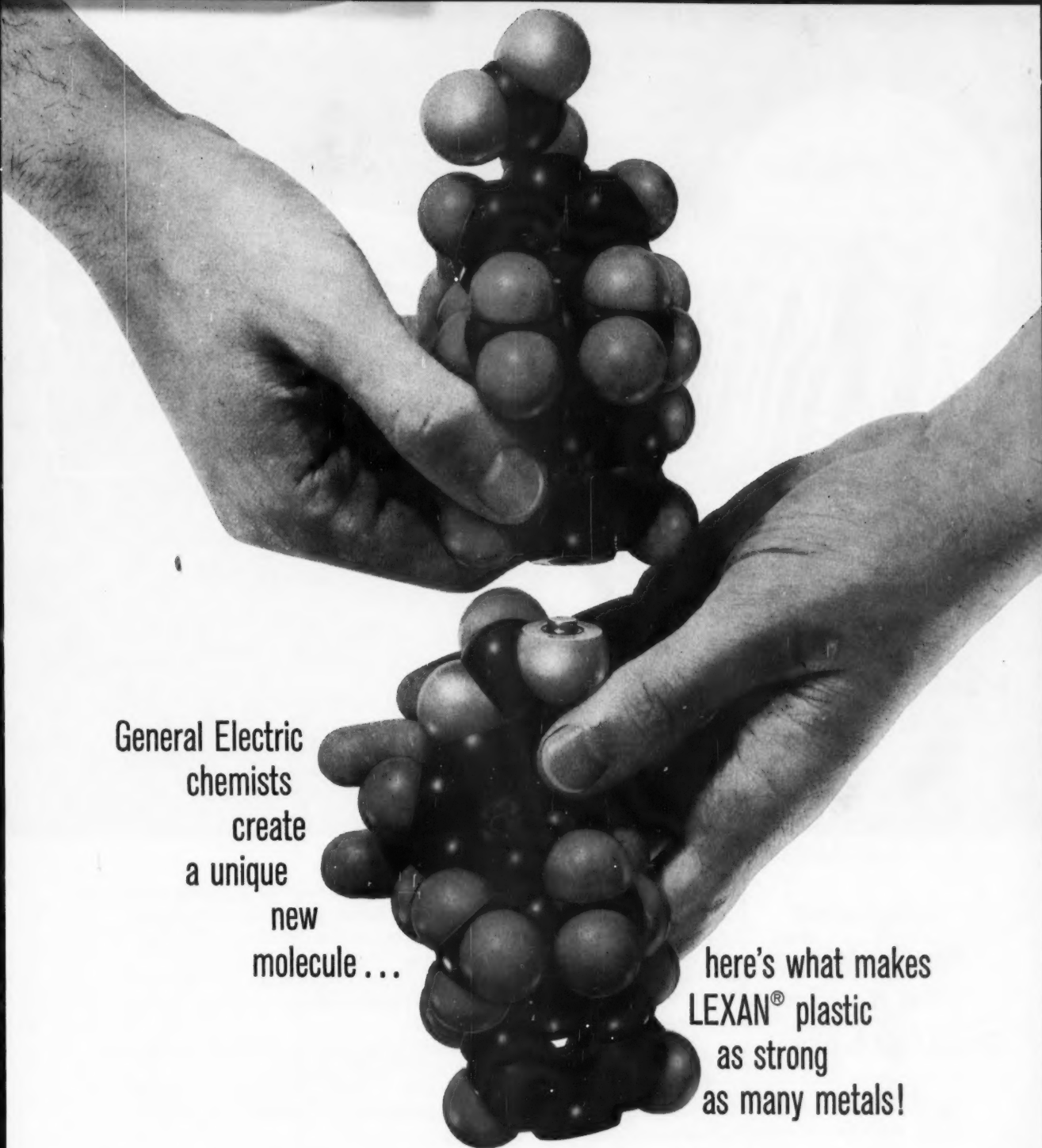
## ENGINEERING

pionaldehyde is 56% propionic acid, 24% higher-boiling fatty acids and 7.5% neutral oil.

**Formaldehyde from Methane:** The German firm of Bergbau AG. Neue Hoffnung (Oberhausen) has received a patent (German DBP 1,050,752) on an improved method for producing formaldehyde from methane. The route involves air oxidation of methane in a fluidized bed reactor at 470 C. The fluidized bed consists of two zones: powdered pumice, which serves as a catalyst; and silicon carbide, which acts as a quenching medium. Feed gas is a mixture of air and methane (5:1 ratio) to which 0.1% nitric oxide has been added. Yield is 41%, based on the methane input. The process is said to allow economical, continuous production.

**Evaporation Control:** A U.S. patent (2,903,330) has been issued to San Antonio consultant Russell Dressler on his suspension process for preparing a fatty alcohol composition that offers improved evaporation control for large bodies of water. The process involves the suspension of finely divided particles of n-octadecyl alcohol (preferably) or n-hexadecyl alcohol in water. This prewetted form of the alcohol disperses into a film many times faster than the same materials in flake or other commercial forms. Fast dispersion is said to overcome the major difficulties that have kept this method of evaporation control from providing 100% surface coverage.

**Alcohols and Ketones:** Union Rheinische Braunkohlen Kraftstoff AG. (Cologne, Germany) has found that telomerization of propylene or butylene with various low-molecular-weight alcohols and ketones results in a good yield of commercially useful higher alcohols and ketones. The reaction proceeds in the presence of dibutyl peroxide at 50-60 atm. and 140 C. Product of the reaction between methanol and propylene is a mixture consisting of 62% C<sub>3</sub>-C<sub>11</sub> alcohols, 28% C<sub>13</sub>-C<sub>17</sub> alcohols and 10% higher alcohols. Telomerization of acetone and propylene yields 51% C<sub>6</sub> and C<sub>9</sub> ketones, 20% higher ketones and the remainder polymers. Unusable polymer products are produced when ethylene is used.



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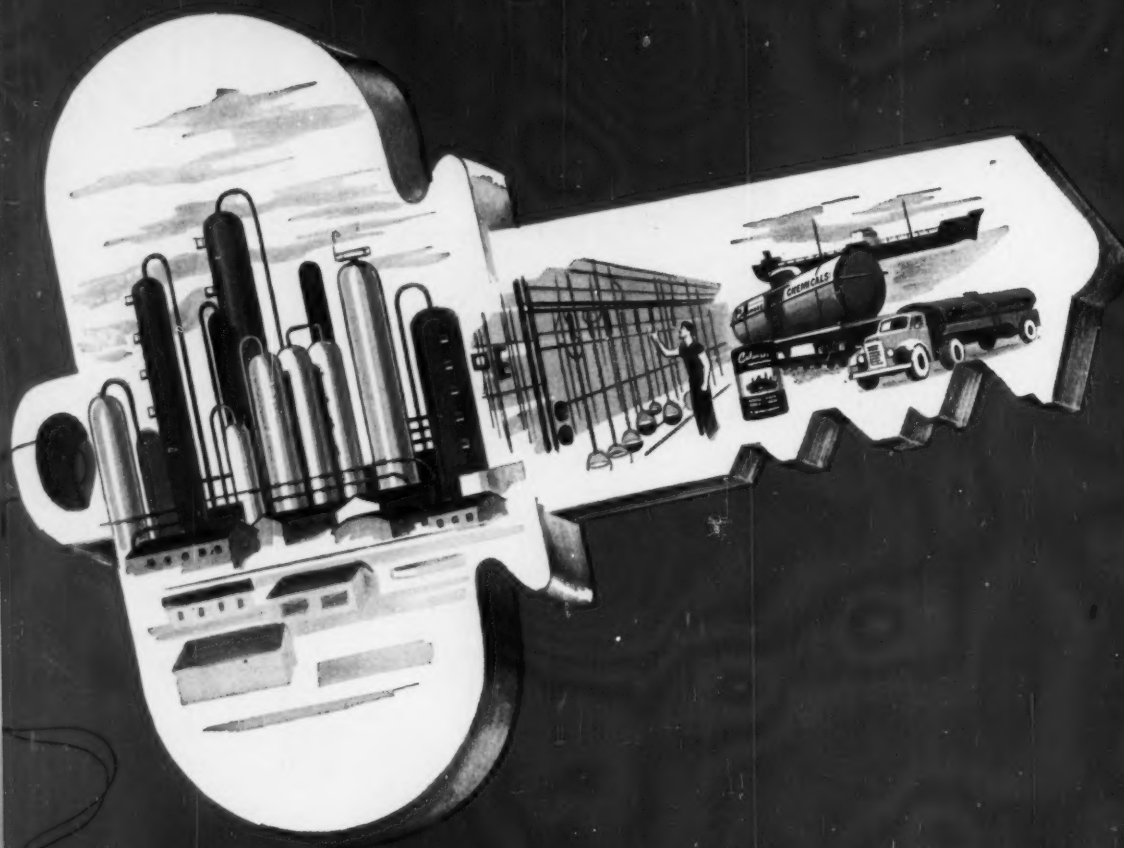
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CHEMICALS

# Technology Newsletter

CHEMICAL WEEK

September 26, 1959

**A significant new development in processing solid rocket fuels** is slated for Thiokol Chemical's new plant at Longhorn Ordnance Works, (Marshall, Tex.). The improvement is a continuous propellant-blending operation, now in final pilot-plant stages. Details are still under tight security wraps, but Thiokol says the process will feature automatic, remote-controlled operation—the control console is equipped with closed-circuit TV.

As it is now set up, the new plant, transferred to the Army last week, provides completely integrated production of solid-propellant rocket motors, from propellant compounding, grain casting and curing, to final motor assembly. The \$6.5-million expansion will boost Longhorn's initial capacity of 500,000 lbs./month by "several hundred thousand pounds."

**Thiokol is working "seriously" on nonchemical power sources,** too, Harold Ritchey, vice-president and technical director, told *CW*. Included: research projects on ion propulsion, free radicals, and nuclear propellents—also on less-futuristic high-energy boron fuels.

At the Longhorn installation, motors are currently being produced for Nike-Hercules, LaCrosse and Falcon missiles. The plant can, however, handle the big Army Sergeant and the new Pershing and Nike-Zeus motors. One clue to the future solid-propellant goals: two new static motor test stands provided by the expansion are designed to test 1.5-million-lb.-thrust engines—more than triple the 450,000-lb. thrust of the most powerful existing U.S. rockets.

•  
**Pending developments in chemical and nuclear explosives** shared the spotlight last week in Denver at the Metal Mining and Industrial Minerals Convention of the American Mining Congress.

- Melvin Cook, professor of metallurgy and director of the Institute of Metals and Explosives Research at the University of Utah (Salt Lake City), described several significant researches destined to increase the usefulness of ammonium nitrate-fuel oil (AN-FO) explosives. Among them: clarification of the influence of surface-active, long-chain hydrocarbon coatings vs. kieselguhr coating for prilled ammonium nitrate; development of new, higher-density ammonium nitrate types for use with fuel oil.

- S. G. Lasky, staff assistant for minerals in the Office of the Secretary of the Interior, predicted potential commercial advantages of nuclear explosives, scheduled for future testing under Project Plowshare. AEC's weapons-testing program, said Lasky, has yielded four facts of possible economic import: (1) Nuclear explosives can excavate great quantities of rock at shallow depths; (2) great quantities can be broken in place by deeply buried shots; (3) much of the energy released may be

# Technology

## Newsletter

(Continued)

retained in the rock as heat; (4) most of the released fission products may be sealed in rock melted by the blast.

•  
**Computer control of ethylene production facilities** at Phillips Chemical Co.'s Sweeny, Tex., plant will be onstream soon. At this week's Instrument Society of America conference in Chicago, North American Aviation, Inc., disclosed that the company will tie in a Recomp—a general-purpose computer made by NAA's Autonetics division—with a Phillips-developed data scanning and conversion system. Goal: a boost in olefin production and quality; more efficient operation of the cracking furnace which converts natural gas liquids into ethylene.

Initially, the combined data scanning and computing systems will be used as an open-loop operating guide system for human operators. Later, it will be used to adjust set points automatically for completely closed-loop operation.

•  
**You'll hear more about Dynamics Reading Chemicals'** coal-chemicals project at Pottsville, Pa. (*CW Technology Newsletter*, May 30), in about four to six weeks. That's the estimate given by Howard Newman (president of Philadelphia & Reading Corp.) and Rex Nicholson (president of General Dynamics' Liquid Carbonic Division) of the time it will take to complete all preliminary activities. Firm bids for the project's engineering work have been received from six companies; 11 more bids are expected before the end of September. Newman and Nicholson say that Dynamics Reading should be formed as a joint subsidiary before the end of the year.

•  
**Two new chemical insect baits look promising** in tests by U.S. Dept. of Agriculture (Beltsville, Md.) researchers. Gypsy moths are lured by 1,2-hexadecanediol; melon flies by 4-(*p*-acetoxyphenyl)-2-butanone. Object of the research is to find compounds that attract insects to traps, where they can be killed by insecticides (*CW*, Nov. 16, '57, p. 36).

•  
**USDA chemists have also found new plasticizers** in dialkylphosphonostearates. At USDA's laboratory near Philadelphia, the plasticizers, made by reacting dialkyl phosphonate and fatty esters, kept polyvinyl chloride flexible at —30 to —50 F. About 35% by weight of plasticizer is required.

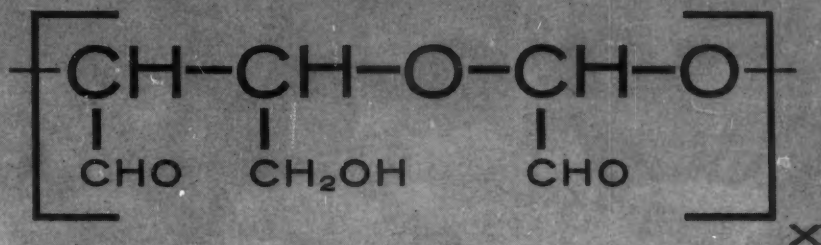
•  
**Du Pont is out with new versions of two familiar products**, this week. Teflon fluorocarbon resins will be offered as thermoplastic film (base price about 17¢/sq. ft./mil when the film is offered commercially late this year).

"Sparkling" nylon, which gets its highlights from facets on the fiber surface, will appear in retail hosiery in mid-October or November. It is more expensive (\$10.25 vs. \$5.25/lb.), will augment rather than replace regular 15-denier monofilament.



# SUMSTAR<sup>TM</sup>

First commercially available polymeric dialdehyde



This unique new source of aldehyde groups gives you an infinite range of cross-linking possibilities

SUMSTAR is our tradename for the first polymeric dialdehyde ever offered commercially. SUMSTAR opens up limitless possibilities for new products and modifications of your present products. A wide variety of materials, both synthetic and natural, can be cross-linked to varying degrees using SUMSTAR.

Originally developed by the U.S.D.A.'s Northern Utilization Research and Development Division, the process has been adapted for manufacture by Miles Chemical Company.

SUMSTAR can be described as a polymeric dialdehyde produced by the oxidation of cornstarch. The highly specific periodate ion breaks the carbon-to-carbon bond between C<sub>2</sub> and C<sub>3</sub> of the anhydroglucose units of the starch molecule forming two aldehyde groups. The extent of oxidation is carefully controlled. Currently we offer three grades as indicated below.

SUMSTAR is a fine powder, nonvolatile, and virtually odorless. Its acute toxicity is only a small fraction of that of other commercially available aldehydes. Here are the specifications:

**SUMSTAR-S** ... over 90% oxidized  
**SUMSTAR-R** ... 75-80% oxidized  
**SUMSTAR-J** ... 50% oxidized  
**Water Content:** Less than 10%

**Heavy Metals:** Average less than 10 p.p.m.

**Sulfated Ash:** 1%-2%

**Bulk Density:** 45 to 55 ml./oz.

Unusually versatile SUMSTAR is so new that the full range of its usefulness is still being determined. However, work in progress indicates excellent possibilities in:

**adhesives** — for laminates

**leather** — tanning

**textiles** — crease resistance and waterproofing

**plastics** — new polymers

**paper** — increase in wet strength

Current information on SUMSTAR is now available in our bulletin No. 6-129 which we will be pleased to send you. Samples are available upon request, and production in pilot plant quantities is now under way. Full-scale commercial production will, of course, permit price reductions which will make SUMSTAR a remarkably low-cost polymer with high aldehyde content.

Coming soon: bisulfite, urea, and melamine derivatives.

## Bulletin and samples

For Miles bulletin No. 6-129 and sample quantities, write, wire, or call us.

SUMNER  CHEMICALS

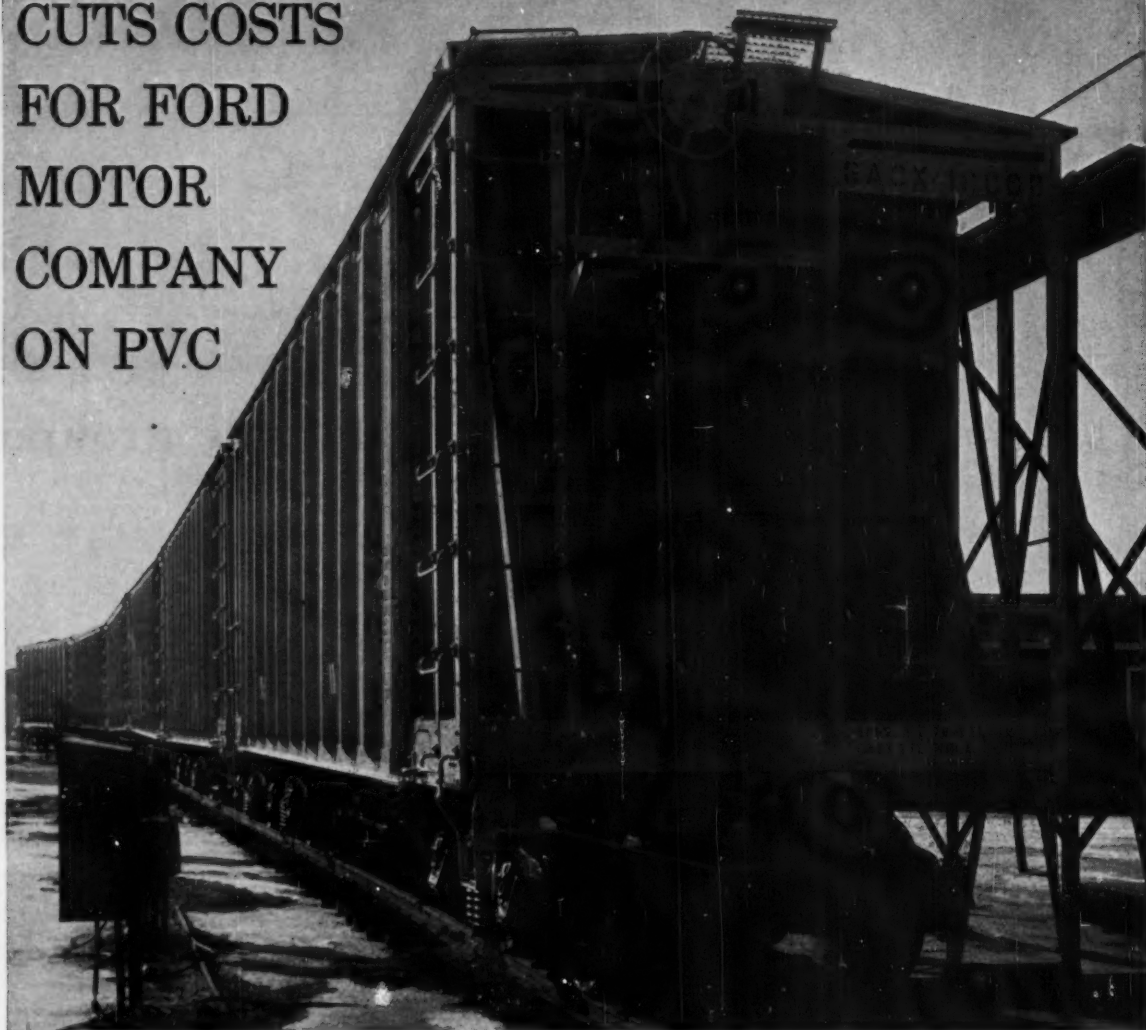
## Miles Chemical Company

DIVISION OF MILES LABORATORIES, INC., ELKHART, INDIANA

General Sales Office: Elkhart, Indiana, Telephone  
JACKSON 3-1130 or Clifton, New Jersey - PRescott  
9-4776 or New York - MURray Hill 2-7920

West Coast Agent: B. W. Holmes, LaCañada, California - MURray 1-5723

# BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the

resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find *it pays to plan with General American.*

**GENERAL AMERICAN TRANSPORTATION CORPORATION**

Airslide Car Department  
135 South LaSalle Street • Chicago 90, Illinois

In Canada: Canadian General Transit Co., Ltd., Montreal





Ross (second from left)\* makes plans with his executive team at newly expanded Charlotte terminal.

## Looking Toward Wider Sales in Southeast

Within the next 18 months, F. H. Ross & Co. (Charlotte, N.C.) will add two new branch locations to its current network of 13 distribution points (see map, p. 84). Ross is already the largest independent chemical distributor in the seven-state territory it serves; its expansion moves highlight a vigorous program for growth begun in 1958, after a four-year period devoted to consolidating previous expansions.

Ross's other growth plans:

- It has just tripled warehouse space at its home office—from 16,000 to 48,000 sq. ft. Bulk storage facilities at Charlotte, now pegged at 126,000 gal., are slated for increase in the near future.

\*Left to right: H. E. Richardson, vice-president and general manager, laundry and drycleaning division; F. H. Ross, Jr., president and treasurer; W. S. Horton, comptroller and assistant treasurer; J. M. Ross, secretary and vice-president of operations.

- The Jacksonville, Fla., branch will soon be doubled in size (to 20,000 sq. ft.). Installation of five 10,000-gal. storage tanks (for hydrochloric, sulfuric and nitric acids, caustic soda and aqua ammonia) will provide bulk storage at its Florida branch for the first time.

- Within a month, Ross hopes to add kaolin clays and glass-fiber matting and cloth to its 14,500-item line of chemicals and laundry supplies.

- Last year, the company opened a new national sales division, with offices in New York. Purpose: to be exclusive national sales agent for American Enka's sodium sulfate and for the glacial acetic acid produced by Sonoco Products (Hartsville, S.C.). Other main functions of the new division, says Ross, are to improve service to Southeast customers head-

quartered in New York and to maintain a closer liaison with Ross's suppliers.

The expansion program will be a main prop in Ross's plans to boost sales 10%/year by '65. Ross now moves about \$15 million worth of chemicals, laundry and drycleaning supplies annually, hopes to top the \$25-million mark.

Ross was founded in 1920 by the late F. H. Ross, Sr., who with one salesman and a secretary, comprised the entire organization. Two branches (at Atlanta and Birmingham) were opened in the '30s. Then, in '46, an ambitious expansion drive began that boosted branch locations to 12 and quadrupled sales between '50 and '59.

The chemical division, says President F. H. Ross, Jr., now accounts for 53% of Ross's sales volume. It



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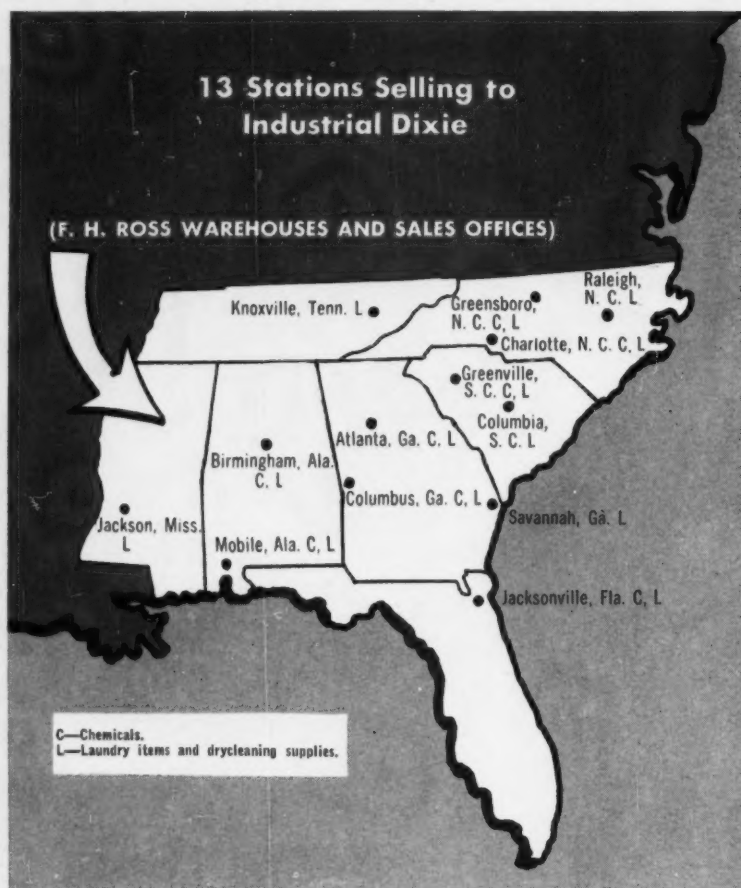
See your Chemical Engineering Catalog for a full listing of KENNEDY products for the Chemical & Process Industries.



Foundry Division

**KENNEDY VAN SAUN**  
MANUFACTURING & ENGINEERING CORPORATION  
DANVILLE, PA.

### SALES



stocks over 500 chemicals of some 50 major chemical suppliers. The bulk of its sales volume comes from the textile, chemical specialties, paint and metal processing industries. A dozen salesmen service the seven-state area (Florida, Mississippi, Alabama, Georgia, Tennessee and the Carolinas). On a dollar basis, Ross's volume leaders are glacial acetic acid, sodium sulfate, caustic soda, perchloroethylene and laundry alkalis.

The newest division, National Sales, now accounts for about 1% of Ross's total volume. The other 46% of the firm's sales dollars stem from its laundry and drycleaning division. In this division, Ross employs 35 salesmen to move a line of 14,000 items that range from zippers and thread to perchloroethylene and laundry chemical specialties.

**Marketing:** About 85% of all warehouse sales and 10% of bulk or tank-load shipments are delivered in company-owned equipment. On a

company-wide basis, that means that only about 15% of branch shipments are made by common carrier. Approximately one-half of all industrial chemical sales are in less-carload-lot quantities; all laundry product shipments are l.c.l., while all national sales shipments are in bulk only.

Heavy use of its own trucking points up one of the cornerstones of Ross's growth: service. The firm's truck fleet has grown from 14 to 71 units in the past 10 years. By minimizing use of common carriers, Ross is able to control deliveries. It feels this system can often effect economies as well.

Like many firms selling in the South, Ross finds that the "personal" approach pays big dividends. "The man at the corner filling station who needs a drum of something gets the same attention as the man that's ordered a thousand times that much," President Ross reports. Friendliness and dependability, he adds, are two

**DOW****SARAN LINED PIPE**

**After eight years carrying lithium chloride brine . . .**  
**no corrosion in SARAN Lined Pipe**

When pipe must carry extremely corrosive lithium chloride brine . . . when floor-level installation freely exposes it to danger of accidental damage from trucks and tools . . . doubly protective SARAN Lined Pipe can mean dependable, low-maintenance operation for many years.

Lithium Corporation of America's Minneapolis, Minnesota, plant produces pure lithium metal as well as various lithium salts. In the production of lithium chloride, SARAN Lined Pipe is used to carry LiCl brine to drying equipment for the removal of water. This brine is extremely corrosive and will quickly eat through steel pipe should a crack develop in the lining. Other SARAN Lined Pipe carries suspensions of lithium fluoride and hydrofluoric acid, a combination which will attack and destroy even glass. Because of its strength and extreme corrosion resistance, there's

never been a failure in the SARAN Lined Pipe.

SARAN Lined Pipe at this plant is installed close to floor level in some working areas, constantly exposed to the danger of accidental damage from trucks and tools. Lithium's engineers stated, "SARAN Lined Pipe provides protection from outside damage and from corrosion by the solutions carried. In eight years of pumping LiCl brine through SARAN Lined Pipe at 30 to 50 psi, there's never been a breakdown, and very little maintenance was required."

SARAN Lined Pipe, fittings, valves and pumps are available for systems operating from vacuum to 300 psi, from below zero to 200° F. They can be cut, fitted and modified easily in the field, without special equipment. For more information, write Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale, Michigan, Dept. 2281AM9-26.

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**

## photo-chemicals



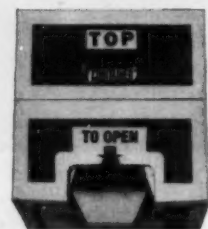
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## SALES

"musts" of company sales policy.

Ross avoids price-cutting battles as much as possible, although it operates in several "price markets." It has found that customers will "stick with you if the service is dependable, although a competitor might offer two or three items at a lower price."

Another factor in Ross's steady growth has been adaptability. It has geared its lines, inventories and marketing efforts to the changing complexion of Southeast industry. About 10 years ago, for example, 90% of the chemical division's sales came from the textile industry. Today, that figure is down to 60%, while sales to the aircraft and electronic industries have forged ahead at a rapid clip.

As a result, hydrochloric and nitric acid (for metal cleaning) sales are now more significant. Compounded alkalis for electronic industry metal cleaning and synthetic degreasers for aircraft manufacturers also get more emphasis now, says Ross. Addition of glass-fiber items is still another example of change, both boat production and glass-fiber building panel production are growing in the area.

Behind the sales bulwarks of service and carefully chosen product lines lies a tight inventory control policy. Normally, a 35- to 45-day inventory is maintained both at Charlotte and the various branches. This is big enough to afford quick efficient service, small enough to keep inventory costs at a profitable level. And like many distributors, Ross pays close heed to maintaining sound relations with suppliers.

**Big on Bulk:** Ross sees bulk chemicals occupying a more prominent role in its chemical sales. Tank farms are now maintained at three locations: Charlotte (126,000 gal.); Atlanta (158,000 gal.); and Greensboro (106,000 gal.). With the planned expansion into bulk at Jacksonville, total bulk storage will hit the 440,000-gal. mark.

Principal items stored in bulk are acetic acid, silicate solutions, sulfuric, formic, nitric, hydrochloric and phosphoric acid, methyl and ethyl alcohol, ketone solvents, formaldehyde, caustic soda and aqua ammonia. About 30 items, says Ross, are repackaged.

Ross's growth has been entirely from within; unlike several large distributors, the firm has not expanded via mergers and acquisitions. And it has no plans to push its marketing

beyond the Southeast territory now serviced.

"When we are getting 90% of the business in the seven Southeastern states we cover," President Ross told *CW*, "then we'll start out in earnest for a broader base."

Opening the New York office, he adds, doesn't basically alter Ross's intentions to remain a regional distributor in the Southeast. Although it sells on a national basis, about 90% of the division's sales are now on a direct-from-plant-to-customer basis.

While Ross is hopeful of picking up a few more items for which the new division will be exclusive sales agent, its major emphasis in moving toward the \$25-million/year sales mark will be judicious expansion and the distributors' old stand-by—personal service.

## DATA DIGEST

• **Ethylene Oxide:** New 48-page brochure updates information on chemical reactivity, physical properties and specifications. Extensive treatment is given to storage, materials handling and safety. Applications are suggested in glycol synthesis, resins, ethanalamines, fungicides and sterilizing agents, and a wide variety of other uses. Dyestuff and Chemical Division, General Aniline & Film Corp. (New York).

• **Toxicology:** New edition of "American Petroleum Institute Toxicological Reviews" on copper naphthenate, naphthalene, naphthenic acids and butadiene updates earlier data. 25¢. American Petroleum Institute (50 West 50th St., New York 20).

• **Soya Alkyd:** A 12-page brochure describes long oil-length soya oil alkyd resin, Setal 62, that is claimed to dry rapidly. Applications are proposed in air-drying interior and exterior enamels for iron and wood surfaces. Compatibility data and physical properties of typical formulations included. Kunstsharsfabriek, "Synthese", N.V. (Katwijk, Holland).

• **Sodium Pentachlorophenate:** Antibacterial and fungus properties are stressed in lumber preservative applications, weed control, adhesive production, slime and algae control and laundry operations. Physical properties and solubility data also included. Reichhold Chemicals, Inc. (White Plains, N.Y.).



## CHEMICAL PUMPS

WORTHITE

TYPE 316 STAINLESS STEEL

Here's proof of Worthite's superior corrosion resistance. Both bars were immersed for 56 hours in 40% sulfuric acid solution at 125° F.

# ARE YOU WILLING TO SPEND A FEW PENNIES MORE FOR THIS KIND OF PUMP PROTECTION?

Worthite\* has become the standard pump material of the chemical industry for one simple reason: it gives a whale of a lot more corrosion protection for a premium of just a few percent.

This can mean major savings in plant operations. By standardizing on Worthite, you get flexibility to make changes in the process without running up against more corrosive liquids than your pumps can handle.

Here's how Worthite compares with Type 316 stainless steel, a very acceptable corrosion resistant material:

	WORTHITE	TYPE 316 STAINLESS
Chromium	20%	18%
Nickel	24%	14%
Molybdenum	3%	3 1/4%
Silicon	3 1/4%	1%

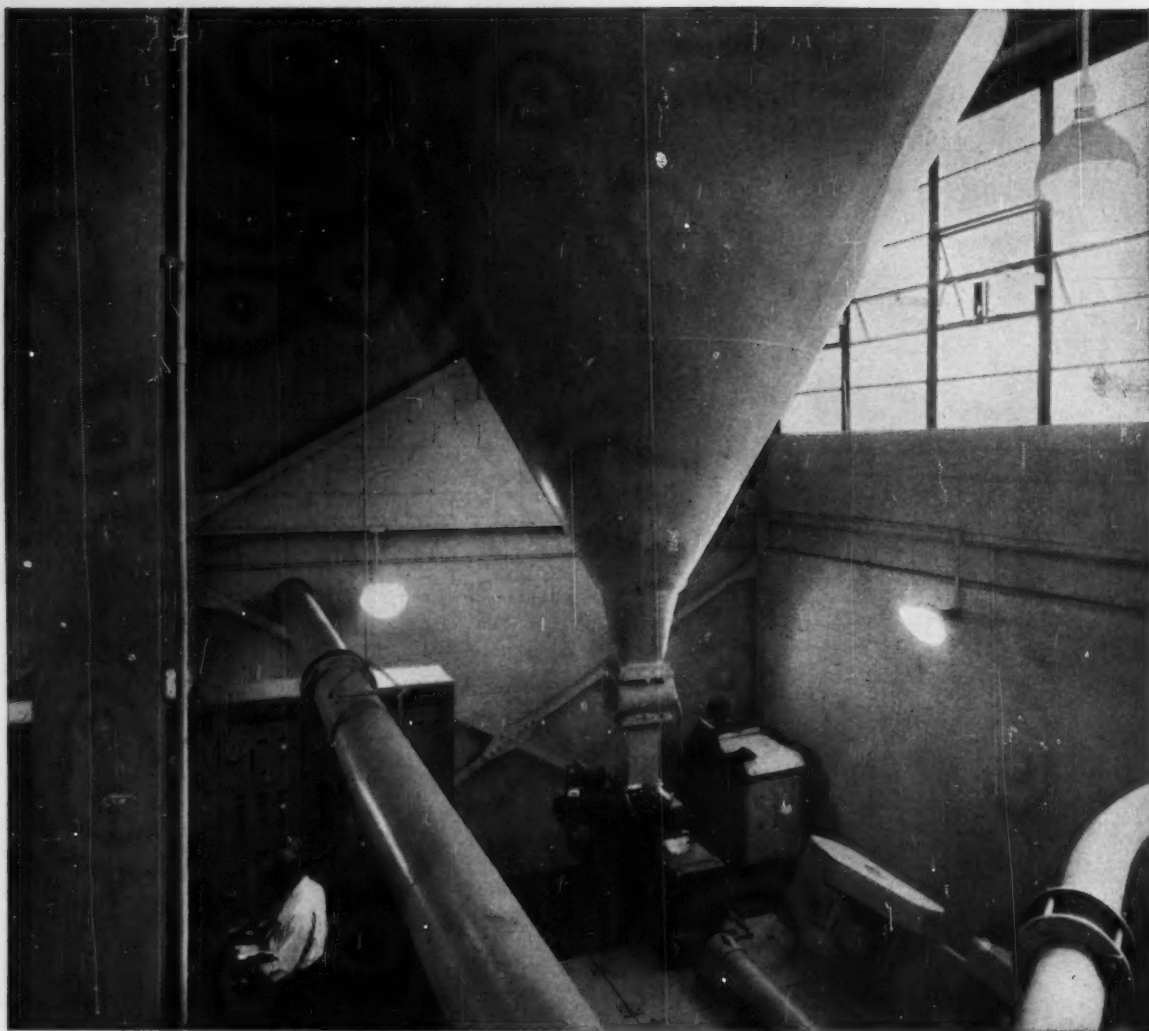
Worthite has almost twice as much alloying material, yet it costs but a few pennies more.

What's the reason for Worthite's low price? By standardizing on this one alloy and by quantity buying and production, Worthington has made its price competitive with ordinary stainless steel.

Isn't it time for you to investigate the advantages of Worthite as a standard? Get in touch with your nearest Worthington representative or see Worthington's insert in Chemical Engineering Catalog. Or write to Worthington Corporation, Section 20-7, Harrison, N. J. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.



\*Trademark Reg. U.S. Pat. Off.



## WHEN THE BEST IS REQUIRED PARLON IS FIRST CHOICE

Here's a photograph worth a million words. It shows the Chemical Feed Room at the Middlesex County Sewerage plant at Sayreville, N.J. Throughout this plant a protective coating must meet the challenge of chemical fumes. That's why Socony Paint Products Company's Sovaklor Chemical Resistant Coatings based on Parlon® chlorinated rubber were selected for walls, beams, hoppers, pipes and other equipment. Perhaps Parlon's long life, resistance to corrosion, and ability to cover almost any type of surface material can solve your maintenance problems. Your supplier of quality paint can tell you more about Parlon, or write direct to Hercules.

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# Market Newsletter

CHEMICAL WEEK

September 26, 1959

**Linear polyethylene producers quickly cut prices**, following Phillips' cuts (down 3¢/lb. to 35¢/lb. in quantities of 20,000 lbs. or more), as expected (*CW, Market Newsletter, Sept. 19*). Before the week was out, Celanese, Grace, Koppers and Union Carbide had posted similar quotes. But Du Pont and Hercules stayed out of the price adjusting, reportedly because their polyethylene products are not competitive with the price-cut materials.

**Likely to follow the PE price-cut is a polystyrene reduction.** Most trade observers felt the PE slash was intended at least partly to sharpen competition between PE and polystyrene in toy (see p. 42) and houseware outlets. (Fast growing polypropylene capacity no doubt was also a factor).

But polystyrene producers aren't being stampeded. A Dow spokesman says there is no immediate move afoot to cut polystyrene tabs; word from Monsanto late last week was that comment would be "premature" before the firm had "thoroughly evaluated full implication of the PE reduction."

**In fact, price of one grade of polystyrene was raised last week.** Dow posted a 4¢/lb. hike on its superimpact polystyrene (Styron 480), bringing cost to 42½¢/lb. in quantities of 20,000 lbs. or more. Although this material is used for toys and housewares, Dow says it is required only where "extreme toughness" is essential, and it does not directly compete with linear polyethylene.

Monsanto, which does not produce a comparable polystyrene, did not raise prices of any of its polystyrene resins.

**Britain is releasing its stockpile of rubber**—about 100,000 long tons—in a move coordinated with the U.S. government's surplus rubber liquidation. Unlike the U.S. move—which was anticipated—the U.K. decision came as a total surprise to the market.

Spokesmen for Britain's Board of Trade says the U.K. stockpile will be disposed as quickly as possible "without affecting the market." Nonetheless, trade observers expect the sale to take all of the recent buoyancy out of the market. There's a possibility, however, that the resultant prices might bring Russia back as a customer, pushing prices back up again. In any case, the existence of a "tap" supply likely will set a definite ceiling on prices.

Stocks to be released are thought to consist mainly of high-grade sheet rubber, which is now short in London.

**Fertilizers from the sea may pose a new problem** for West Coast ag chemical marketers currently investigating discovery of phosphorite (phosphate rock) deposits in the Pacific near San Diego, Calif.



## Market Newsletter

(Continued)

Although a half-ton of phosphorite has already been dredged up, total size of the deposit is still undetermined—which makes the proposed venture highly speculative at this time. And even if the deposits prove extensive, rough development problems face any exploiters.

**Copper chemicals may be in for another price boost** on top of last week's increases—spurred by  $1\frac{1}{2}$ ¢/lb. higher tabs on metal. Crystalline sulfate now costs \$12.35/cwt. (up 40¢); carbonate, \$34.90/cwt. (up 85¢) in car lots.

A spokesman for a major U.S. copper producer predicts that if the copper strike is prolonged—as now appears likely—metal supplies will peter out in about three weeks. Probable result: another round of hikes. There's a chance, of course, that some price increases—for example, on copper chloride which wasn't affected first time around—may come before the expected critical metal supply pinch in mid-October.

**More 2-ethylhexyl acrylate is now pouring out** of Celanese's recently expanded (estimated capacity 15 million lbs./year) plant at Pampa, Tex. The product is one of many acrylate monomers turned out by the firm.

Dow Badische's acrylate plant—abuilding at Freeport, Tex.—is due onstream in early '60; the nation's acrylate capacity boosts are attracting considerable attention in light of an already more than ample capacity—estimated at almost twice current demand (*CW*, Aug. 1, p. 60).

**More than 1 billion lbs./year of noncellulosic fibers** will be consumed by '65, according to *CW*'s corridor census of textile experts at the Chemical Market Research Assn.'s annual resort meeting this week at Williamsburg, Va.

Some forces behind the booming synthetic market were spelled out by Du Pont's J. L. Martin: surging population, molding of consumer preferences through promotional education, improved production technology and marketing savvy.

But significant, too, was a note of caution sounded by J. B. Goldberg, moderator of a semiformal panel discussion. He figures natural fibers ought to continue to sell at a good rate. New market developments in both natural and cellulosic fibers will give noncellulosic synthetics increasing competition. Bolstering his contention: a National Cotton Council report that wash-and-wear finished cottons helped sell about 800,000 bales of cotton that otherwise would not have been consumed.

### SELECTED PRICES CHANGES—WEEK ENDING SEPTEMBER 21, 1959

	Change	New Price
<b>DOWN</b>		
Corn oil, crude, tanks	\$0.00375	\$0.11125
Lycopodium, cs.	.25	3.75
Polyethylene, high density	.03	.35
Phenylethyl isobutyrate	1.70	3.45

All prices per pound unless quantity is quoted.



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You can discover them by the score—new worlds of exciting products made from Sinclair petrochemicals.

For example, a new rope made from Sinclair propylene is so light it floats. Yet it can secure a tanker in a hurricane.

The Sinclair Organization is proud of its reputation for *performance*. Sinclair plants built to supply requirements

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For prompt, dependable supplies of the finest petrochemicals available—see

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**Convert a gallon of liquid to  
a powder with 28¢ worth of**

## **MICRO-CEL**

**SYNTHETIC CALCIUM SILICATES**

**P**ROBLEMS IN PROCESS formulations are finding new answers every day in Micro-Cel . . . Johns-Manville's new line of synthetic calcium silicates.

At a delivered cost of 8¢ to 10¢ per pound Micro-Cel can match—even outperform—many higher-priced fillers in dry or liquid products. Check these three cost-cutting product improvements Micro-Cel can give you.

**1. MICRO-CEL** remains a free-flowing powder even when mixed with more than twice its weight of liquid . . . provides ultimate absorption of up to six times its weight in water . . . controls viscosity . . . prevents caking.

**2. IN DRY PRODUCTS,** Micro-Cel will bulk up to a full cubic foot for every six pounds. A little Micro-Cel

goes a long way toward improving product density, reducing package outage.

**3. MICRO-CEL** particles are as small as .02 micron, blend and disperse well, extend pigments to the maximum.

Micro-Cel, the powder that flows like a liquid, is a new line of inert synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. Its unique combination of properties has already brought important benefits and savings to many processors. *Maybe you will be next.*

For further information, samples and technical assistance write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

**You can absorb  
a gallon of liquid  
with 3 lb. of  
MICRO-CEL**

**and get a dry  
free-flowing  
powder  
like this ➡**

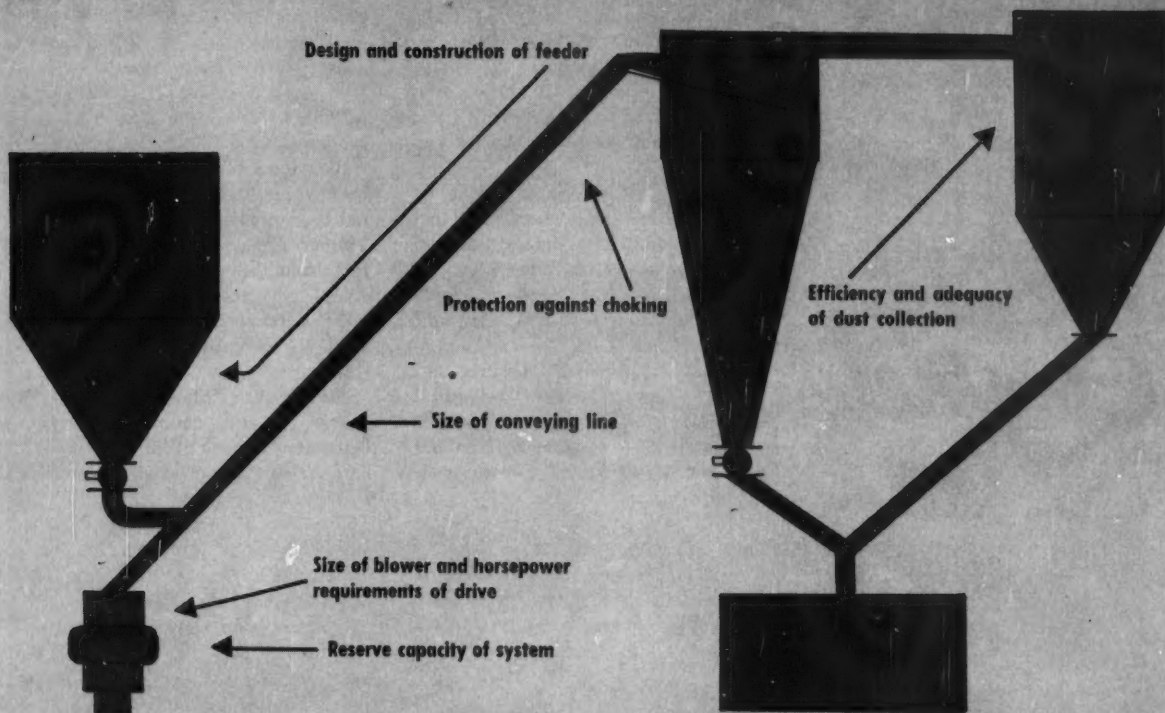


**Johns-Manville MICRO-CEL**  
**A product of the Celite Division**



# PRODUCTION

**Before buying a pneumatic conveyor, check these points:**



## Sorespots Spur Search for Conveyor Cures

If the checkpoints shown above give pause for thought to chemical companies now shopping for pneumatic conveying systems, John Fischer says, his calling them to attention will have been worthwhile. Fischer is chief engineer at Sprout, Waldron & Co., and he's concerned over a growing threat to the hard-won reputations of pneumatic conveying system makers.

A number of new companies are entering the pneumatic conveying field. Some of them are getting jobs through low bids rather than engineering know-how, say the well-established firms. When the newcomers haven't the resources to solve the problems they create, buyers wind up with unworkable systems. Thus, pneumatic conveying's reputation gets a wound that's difficult to heal.

"It's an industry with a high mortality rate," says Kemp Engelhart, vice-president of Fuller Co., the oldest pneumatic conveyor maker in the country.

Hank Stoess, who manages Fuller's Airveyor Division, says the industry is strewn with bankruptcies. "An experienced company can put in 25 installations that will work satisfactorily. But then it will come up with one sick cat that takes a lot of medication to make it well," he says.

Small, inexperienced companies often run into the "sick cat" on an early job, can't stand the gaff. Fischer points out that probably every company has had at least one system that has cost as much in corrections as in initial cost.

**A Look at Figures:** It doesn't take

a long look at figures to see what has been happening. In the late '40s, there were only about five makers of pneumatic conveying systems. By '56, the number had more than doubled, with business volume about \$6-8 million. Today, there are about 70 companies in the field, with sales estimated at \$10-12 million.

The "Big Three" in the industry—Fuller (Catasaquua, Pa.), Dracco (a division of Fuller at Cleveland) and Sprout, Waldron (Muncy, Pa.)—probably account for a little over one-half the sales volume. Superior Separator Co. (Hopkins, Minn.) is usually ranked fourth; Young Machinery Co. (Muncy, Pa.) is probably fifth.

**Their Own Fault:** Conveyor makers trace their present difficulties to their



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## Complete Line OF HYDROSULFITES

Jacques Wolf—chemical specialists with more than 50 years' experience—offers a complete line of hydrosulfites in any quantity from a test tube to a truckload. Whatever your field—textiles, food processing, pharmaceuticals, paper, processing synthetic rubber, bleaching clay, soapmaking—if hydrosulfites are required, Jacques Wolf has the formula for the action you need, where, when and as you need it! For example:

**HYDROSULFITE OF SODA CONC.**  
( $\text{Na}_2\text{S}_2\text{O}_4$ )  
Non-dusting; non-crusting

**HYDROSULFITE AWC**  
( $\text{NaHSO}_2 \cdot \text{CH}_2\text{O} \cdot 2\text{H}_2\text{O}$ )

**HYDROZIN**  
 $\text{Zn}(\text{HSO}_2 \cdot \text{CH}_2\text{O})_2$

**HYDROSULFITE BZ**  
( $\text{Zn} \cdot \text{OH} \cdot \text{HSO}_2 \cdot \text{CH}_2\text{O}$ )

**ZINC HYDROSULFITE**  
( $\text{ZnS}_2\text{O}_4$ )

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## PRODUCTION

own doorstep. Pneumatic systems fit well into the modernization picture. They help cut labor costs, often have the pluses of greater safety, cleanliness and flexibility of installation over other materials-handling systems (e.g., mechanical conveyors). "The newcomers realized the potential and that we haven't really scratched the surface," says Engelhart.

Fischer says: "This is one business that didn't feel the recession. We just haven't been able to expand fast enough."

William Geist, vice-president of Young points out, however, that chemical industry orders did not hold up during the recession: "They actually fell off. But the flour, starch and food business pushed sales up."

One chemical plant's chief engineer hints that perhaps business has been too good. He claims the service of "some of the big fellows" is poorer than it used to be, that the "caliber of their engineers that call on us is below par."

"The big trouble is that we've made pneumatic conveying look too easy," theorizes Engelhart. The advertising of those in the industry probably stressed the simplicity of installation too much—a feeder, piping, a fan or blower and collecting systems for product and dust. It is only natural that many newcomers were attracted by this pretty picture, particularly since they could buy the components for the system from others, he says.

**Know-How Counts:** "We like to get paid for what we know, not what we do," says Fischer. He points out that in nine out of 10 cases, experienced, reputable manufacturers submit similar designs when bidding for a job.

"Compare components. If there is a marked difference between different designs, insist on demonstrations that will prove that the odd design will do the job," Fischer warns potential customers. And, the demonstration runs should last for six or seven hours (until conditions in the system have stabilized).

In addition to comparable horsepower, line sizes, blower or fan sizes and feeders, competitive systems should have comparable dust collecting systems. Also, Fischer suggests, would-be buyers should look for reserve capacity. A 5-hp. motor might seem adequate; but when put into

service, the system may plug. Inexperienced companies may say it is merely the result of uneven feed rate. Experienced companies anticipate this in design, may, for example, suggest a 7.5-hp. motor, he says.

The systems should also be compared for devices to protect against choking, Fischer adds. "This is usually caused by feeding too much material for the air supplied. A cutoff device that shuts down the system in this event is needed."

"Sometimes you won't run into trouble in the field until the system has been running for several months," Fischer adds. "Changes in temperature, humidity or particle size may completely change handling characteristics and plug up the system. That's when problem-solving experience counts."

**Still an Art:** "Materials-handling is still an art, and pneumatic conveying is the most ticklish of all," says Engelhart. "That's why reputable firms rely heavily on experience."

For example, one chemical company says that two of the larger pneumatic makers wouldn't touch a system for handling somewhat sticky, plasticized resin. But U.S. Hoffman Machinery Corp. (New York) bid on the job. "If it hadn't shown us a similar system now in operation, we probably would have dropped the whole idea," says the chemical firm's chief engineer.

Sprout, Waldron admits it wouldn't try to compete with Fuller in cement handling. By the same token, Young has built its reputation on specialized handling (e.g., polymers for synthetic fibers using stainless steel equipment and a nitrogen blanket).

"Originally we thought that any free-flowing material could be easily conveyed. But we've all learned through experience that this isn't always true," says Geist.

The pneumatic system manufacturers stress that reputability can't be determined by a company's size. Some of the smaller companies have built reputations in specialized lines. Their advice: compare competitive bids, test facilities and experience in conveying the material in question. If potential customers do this, the system that is installed will probably perform satisfactorily, and the growing pains of the pneumatic system suppliers' own making may eventually be eased.



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Visitors watch model showing 50-year growth of Esso refinery.

## Tracing a Refinery's Growth

Most companies plan some sort of celebration for important corporate anniversaries. But few plants celebrate as elaborately as did Esso's Bayway Refinery (Linden, N.J.) last week.

The refinery held a week-long 50th anniversary fair, attended by employees, the public, local civic groups and state and local government officials. Exhibits, many of which were housed in a 60x120-ft. air-inflated vinyl building on the refinery grounds, traced the development of processing activities and their relationship to the surrounding community.

Highlight of the exhibits was the "diarama" (above), a 34-ft. scale model of the refinery. The model, built by Barrett Associates (Middlebush, N.J.), traced the growth of the refinery. Revolving panels showed how farms, fields and obsolete process units were replaced with the current process units. The changes were synchronized with a 15-minute tape recording and with 17 lighting changes.

One of the other exhibits: a 50-year-old paybook. The pen-and-ink entries show pay rates for first-class mechanics of 34¢/hour, some jobs with starting rates of 11¢/hour.

Esso brought out the old steam whistle that had once signaled the beginning and end of the work day, set it atop the catalytic plant tower, and used it to announced the start of the fair. The day shift was terminated

early to permit employees to attend the fair's opening. The first day's activities included entertainment and supper for all employees.

A special luncheon was held for employees of '09 who helped build the refinery. The celebration was concluded with a picnic for families of the employees.

It was the first celebration of its type held by Esso, although the nearby Bayonne refinery is even older—84. "No one thought of celebrations like this 30 years ago," said one company official.

Fred Westphal, administrative superintendent at Bayway, said that while an important plus of the fair was the public's attendance (an estimated 15,000 during the fair's one weekend), the main purpose was to show employees how they have contributed to the growth of the refinery.

## EQUIPMENT

**Chemically Treated Wood:** Kofural impregnated wood is a new chemical-resistant material of Koppers Co. (Pittsburgh 19) for process equipment applications such as filter-press plates and frames, tanks, flumes, trays and ducts.

The vacuum-pressure-treated wood resists attack of most acids and alkalis. Exceptions: chromic, nitric and hypochlorous acids, sulfuric acid at con-

centrations over 70% and temperatures above 75 F, aniline, wet and dry chlorine gas, bleaching solutions such as chlorine dioxide and sodium hypochlorite.

**Filters:** New in filtering—a horizontal leaf filter, a filter cartridge and a filter cloth.

The horizontal leaf filter, called Type HL, is offered by Process Filters Division of Bowser, Inc. (Fort Wayne, Ind.). The filter uses permanent filter cloths or filter papers, has a bottom leaf contoured to the case so that all liquid in the tank is easily filtered out at the end of the cycle.

The filter cartridge is replaceable, made of viscose fibers by American Felt Co. (Glenville, Conn.). The cartridge is said to have up to six times the life of other cartridges, offers filtration in the 5-75-micron range.

The filter cloth, called Amfab, has been developed by Amflex Products Dept. of The American Machine and Foundry Co. (New York). The cloth is a glass-fabric-reinforced material coated with Teflon or Sylkyd resins for resistance to chemicals and heat to 500 F. Another glass fabric, a Teflon-impregnated cloth, called Fiberfilm, has been developed by Amflex specifically for laboratories.

**Turbine-Type Pumps:** Aurora Pump Division of New York Air Brake Co. (Aurora, Ill.) has redesigned the shell housing of its Apco two-stage turbine-type pumps to direct the fluid from the first-stage to the second-stage impeller in a 180-degree cross-over. The redesign balances radial loads, eliminates shaft deflection. Capacities: to 150 gpm.; pressures: to 300 psi.

**Centrifugal Compressors:** Elliot Co. (Jeannette, Pa.) is out with a new line of centrifugal compressors for low-flow, high-pressure applications. Units, designated Type R, are available in single- and two-stage models, are recommended for air as well as other gases. Capacities: 800 to 8,000 cfm.; pressures: to 1,000 psi.

**Transfer Pumps:** Turbocraft, Inc. (492 East Union St., Pasadena) is offering a new series of transfer pumps for petrochemical and cryogenic materials. Capacities: 10-8,000 gpm.; differential pressures: up to 300 psi.

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# ADMINISTRATION

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Spanish cities and industrial plants are rigging for austerity in drive to bolster sagging economy.

## Spain Primps for New Dollar Investors

Spain—near-bankrupt nation of bullfights, lagging industry and national trusts—is in the midst of a painful economic reformation. Primary purpose of the reform program is to bring into Spain much-needed U.S. investment dollars and technical know-how. But as late as last week, U.S. chemical company management viewed the reformation with, at most, cautious optimism, indicated no intent to rush into Spain with new ventures.

Behind the Spanish economic reformation was the belated realization by government officials that the country had reached the end of its financial rope—that if bankruptcy was to be averted, drastic changes had to take place. Of equal significance was Spain's recent admission as the 18th member of the Organization for Euro-

pean Economic Cooperation, for in order to join that body—a move General Francisco Franco finally agreed was necessary if his country was to continue to receive outside financial aid—Spain had to consent to put its economic house in order.

Confronting Spanish officials were these bearish facts:

- Spanish gold reserves were all but used up—down to an “untouchable” \$57 million stored in the Bank of Spain as backing for the national currency.

- The country's trade deficit was increasing. In the past two years, it has been about \$250 million annually (most of which was compensated for by U.S. aid). In '50, Spanish imports about balanced exports, but in '58 imports were nearly double exports in value.

- Inflation and unemployment were rising. In the last three years, the cost of living jumped 40%. In addition, people were buying less, inventories were building up, overtime was being eliminated, and, in many industries, plants and businesses were closing.

Observers cite five factors as being responsible for the Spanish economy's decline: Too much industrialization, too fast; neglect of agriculture; exclusion of foreign investment capital; excessive government controls and red tape; overvalued currency; and a complicated system of multiple exchange rates.

While this economic decline was taking place, U.S. aid—over \$1 billion in six years—helped the economy limp along just this side of bankruptcy. The aid had no regenerative



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## ADMINISTRATION

### Spanish Chemical Production

Products	Production in Metric Tons		
	'55	'56	'57
Pyrites (ferrous, ferro-copper)	2,050,000	2,288,856	6,500,000**
Potash (as K <sub>2</sub> O)	190,000	232,716	227,916
Zinc	23,700	155,688	141,348
Iron	*	4,400,988	5,378,052
Manganese	*	41,472	36,780
Copper	9,700	25,644	25,564
Crude sulfur	39,000	120,353	117,972
Nitrogenous fertilizers	225,000	*	266,584**
Sulfuric acid	856,000	*	1,959,824**
Ammonia	*	*	25,808**
Sodium carbonate	109,000	*	10,414**
Caustic soda	100,000	*	121,379**
Insecticides	*	*	1,256,262**
Rayon	13,600	*	18,375**
Other synthetic fibers	32,300	*	50,485**

\* Not available. \*\* 1958 data. Source: Spanish government's latest available statistics.

effect, because it was given with no strings attached. The U.S., with military agreements at stake, didn't want to risk offending Franco by insisting on economic reform. OEEC membership, however, did come with strings attached—to be eligible for aid and other advantages, Spain had to agree to OEEC's suggested remedies, institute a stiff austerity program.

**Holding the Line:** Twin aims of the reform program, according to Mariano Navarro Rubio, finance minister, are to hold the price line at home, to maintain the peseta's new value of 60 to the dollar abroad. To accomplish these aims, the government has executed or is planning these changes:

- 43% devaluation of the national currency and stabilization of the peseta at 60 to the U.S. dollar.
- Drastic cuts in government spending in private areas.
- Cutbacks in the number of official agencies and easing of red tape.
- Trade liberalization, including removal of quotas on raw materials and half of the commodities privately imported.
- Hike in foreign ownership limits to 50%, and 100% in special cases.
- Free transfer of dividends and profits by foreign investors.
- Labor law reform curbing the

power of politically oriented Falange syndicates (unions), increasing the influence of employer over employee.

**Official Objections:** Despite the sorry state of Spanish finances, not all officials felt that drastic reform was needed. One leader of the opposition was Jose Antonio Suñances, head of Instituto Nacional de Industria (National Industrial Institute — INI). He objected in particular to the decision to place government-sponsored trusts, such as INI, on a self-supporting basis, although INI already controlled Spain's petrochemical and nitrogenous fertilizer production.

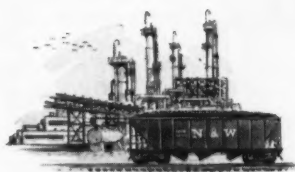
Spain's chemical industry accepted the idea of reform. Along with the mining industry, the chemical industry had been treated liberally with regard to investments, particularly since the institution of Franco's Decenal Plan in '56. The plan called for investment of 20,000 million pesetas (approximately \$300 million) annually in industry and agriculture, plus grants in aid of \$1,045 million over seven years.

While the plan fell short of expectations, some U.S., French, British and Belgian capital did filter into Spain's chemical industry in the form of direct investments by such firms as Monsanto, Sherwin-Williams, St. Gobain (France) and Solvay & Co. (Belgium). As a result, the chemical

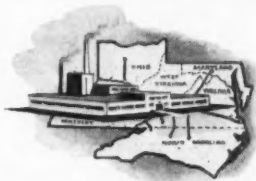


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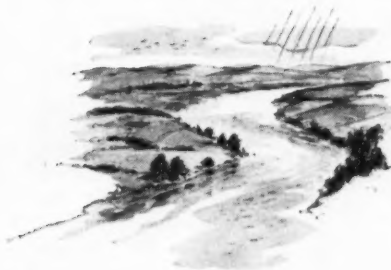
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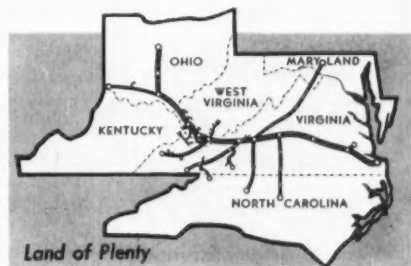


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## ADMINISTRATION

industry, while unable to compare favorably with its European counterparts, began to flourish, absorbing 40% of Spain's annual industrial investment (about \$10 million in '58).

**Industry Standing:** The Spanish chemical industry has several strong areas (see table). Spain, for example, is Europe's major producer of pyrites, annually producing 6.5 million metric tons, exporting 4.2 million metric tons (42% of total world consumption).

To satisfy the country's rapidly growing appetite for nitrogenous fertilizers, Spain is building a 500,000-metric-tons/year industry featuring plants of both INI and private industry.

The organic chemical industry is small, but developing rapidly. In this area, INI is the major strength, turning out 65,000 metric tons of organic tars, natural gas. Planned production is geared to cover 74% of national demand.

Spain's pharmaceutical industry is unable to supply national demand. Locally produced products include agar-agar, alkaloids, penicillin and other antibiotics and vitamins. Spanish companies produce mainly under foreign patents, including those of Merck & Co. and Schenley Laboratories.

Approximately 124,000 Spanish chemical producers employ 33,486 workers in 1,541 plants and represent an annual investment of \$110 million. Gross annual production last year was estimated at \$8.7 billion, of which \$23 million worth was exported. Chemical imports, however, were \$119.3 million, paralleling the national trend of imports outnumbering exports five to one.

Despite Spain's stated intentions to reform its economy, make it easier and more attractive for entry of foreign investment capital, U.S. chemical process and CPI concerns plan no immediate leaps into this "Gateway to Africa and the Middle East."

The attitude most often heard is the noncommittal one expressed by Monsanto's Vice-President Marshall Young:\* "Monsanto is optimistic about Spain's business climate. We will continue to explore methods of expanding our Spanish manufacturing interests."

\*Manager Overseas Division, directing that company's 25% interest (since '50) in Etino-Química S.A. (producing caustic soda, vinyl chloride monomer, polyvinyl chloride, chlorine and styrene molding materials).

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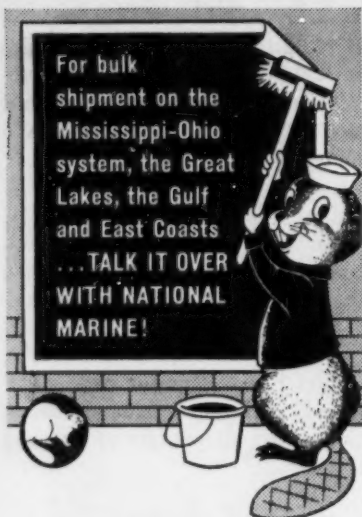
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## ADMINISTRATION

### More Nuclear Training

The U.S. is taking another broad step to promote development of peaceful uses of atomic energy. One aim: to give chemical process industries management a larger selection of highly trained scientific personnel for nuclear projects.

Next February, the International School of Nuclear Science and Engineering at the Atomic Energy Commission's Argonne National Laboratory (Lemont, Ill.) will switch its curriculum from undergraduate to graduate work. It will be known as the International Institute of Nuclear Science and Engineering.

In the past, the school—established in '55 to assist friendly nations in developing peaceful uses of atomic energy—has been a training ground for undergraduates. The changeover comes, according to a school spokesman, because undergraduate instruction in nuclear sciences is now available in a number of colleges and universities here and abroad.

Appointments to the institution, operated for AEC by the University of Chicago, will be made in five graduate-level programs—reactor science and technology, engineering research and development, physical science research, life science research and the engineering, administration and operation of nuclear facilities. Appointees must have equivalent of a master's degree from a U.S. university.

Through its first eight sessions, the school trained 478 scientists and engineers, 102 from the U.S., 376 from 43 foreign countries.

## LEGAL

**Weight-Reducing Capsule:** Delmar Pharmacal Corp. (Rensselaer, N.Y.) has been cleared by the New York State Board of Pharmacy of fraudulent advertising as charged by Arthur Flemming, secretary of the U.S. Dept. of Health, Education & Welfare. Flemming listed a capsule made by Delmar among 27 products and devices that were the objects of Food & Drug Administration crackdowns last year.

The board said Delmar admitted making the capsule, but denied ascribing any "wondrous slenderizing qualities" to the product, sold as

Special Formula No. 2—Trim-all capsules.

**Unfair Competition Suit Dismissed:** Federal District Judge Sylvester Ryan (New York) has dismissed the trademark infringement and unfair competition action instituted by Harold F. Ritchie, Inc. (New York), against Chesebrough-Ponds (New York).

In dismissing the action, Judge Ryan held that there was no similarity or likelihood of confusion between Ritchie's Brylcreem and Ponds' Valcream. He added that Ritchie had not proved any of its allegations of infringement or unfair competition. The company had sought an injunction against continued use of the name Valcream, a cream-style hair dressing introduced by Ponds in '55.

## LABOR

**Wage Contracts:** Seiberling Rubber Co. (Barberton, O.) and Locals 18 and 278 of the United Rubber Workers have signed a wage agreement calling for an increase of 10¢/hour. The contract covers 1,500 workers, is retroactive to Sept. 7.

At Victor Chemical Works' mines at Maiden Rock and Canyon Creek, Mont., 120 miners, members of Local 904, International Union of Mine, Mill and Smelter Workers, voted to accept a three-year contract offered by the company. The contract calls for an 8¢/hour wage increase (retroactive to Sept. 7) the first year, 5¢/hour the second and 5¢/hour the third year. There also will be an additional paid holiday, three weeks' vacation after 10 years' service, effective after Jan., '60.

And, at Monsanto Chemical Co.'s Mound Laboratory (Miamisburg, O.), workers have returned to their jobs following ratification of a three-year contract. The laboratory, operated by Monsanto for the Atomic Energy Commission, was struck 22 days.

The 400 workers, members of Local 11-4200, Oil, Chemical & Atomic Workers Union (AFL-CIO), will get an 11¢/hour first year wage boost, effective immediately, and 8¢/hour increase in each of the next two years.

Their new contract provides for fringe benefits and a cost-of-living escalator clause. Union demands for a union shop and removal of a non-



# LINDE packaged oxygen plant sets nine-year record for availability!

**T**HE LINDE oxygen plant shown here has been serving a leading chemicals producer "over-the-fence" continuously since 1949. Its operating log shows a 98%+ availability factor. Next year, capacity will go up from 360 to 800 tons of oxygen a day.

You can expect the same continuity of supply with a LINDE packaged plant serving your process. Your LINDE plant will be the product of fifty years' experience in the design, manufacture, and operation of air separation plants and low temperature equipment. LINDE is uniquely qualified to provide air separation plants for the supply of oxygen and/or nitrogen as well as the associated low temperature equipment for:

- liquefying hydrogen, helium and fluorine
- purifying hydrogen and helium
- separating hydrogen from coke oven gas
- ammonia and methanol synthesis
- upgrading of natural gas
- other extremely low temperature processes.

Put LINDE's more than 50 years' experience in gas separation techniques to work for you. Write Dept. CW-94, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada: Linde Company, Division of Union Carbide Canada Limited.

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CARBIDE**

Industries that regularly require large quantities of oxygen or other atmospheric gases can obtain those they need from a LINDE plant on their own sites. The oxygen plant illustrated—built, owned, and operated by LINDE—is at a plant of one of the nation's largest chemical processors.

# Tracers

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CHEMICAL  
PROCESS  
INDUSTRIES

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## POSITION VACANT

**Plastics Salesman:** Spencer Chemical Company seeks a man with enthusiasm, drive, and a desire for future progress in a plastics sales assignment. Preferably, we would like a man with technical education and approximately five years' industrial sales experience. This position offers an excellent opportunity for future advancement in an expanding organization. Please send complete resume of your experience, education, and salary requirements to: Personnel Manager, Spencer Chemical Company, 610 Dwight Bldg., Kansas City 5, Mo.

## SELLING OPPORTUNITIES AVAILABLE

**Chemical jobber upstate Indiana, fine well-established line Industrial Chemicals,** requires services experienced Industrial Chemical Salesman. Liberal salary commissions, expenses. Car furnished. Opportunity advancement. Chance to buy into company over the years. If experienced, send resume to SW-2628 Chemical Week. Our employees know of this advertisement.

**Salesman wanted—Industrial chemicals.** The two Carolinas and Virginia. Worth Chemical Corp., Greensboro, N. C.

**Resin Salesman—New York, New England area.** Expanding sales effort by growing chemical company offers excellent opportunity for experienced resin salesman to sell line of hard resins and pure phenolics to paint, ink and adhesive trade. Reply in confidence by sending complete resume and salary desired. SW-2653, Chemical Week.

## POSITIONS WANTED

**Chemical Engineer recent graduate veteran B.S.** degrees in Ch.E. & Bus. Admin. seeks position utilizing education. FW-2658, Chemical Week.

**Industrial Chemical Salesman, B.S. degree, seven years successful sales experience, married, age 33,** desires responsible sales position in Los Angeles. FW-2652, Chemical Week.

**A registered chemical engineer with ten years experience in chemical processing and development** desires a responsible position in production management. PW-2677, Chemical Week.

**Excellent 10 year record in sales management,** sales of insecticides and fertilizers. M.S. degree in Agronomy and Agricultural Chemistry. Outstanding references. Desires new opportunity. FW-2599, Chemical Week.

## SELLING OPPORTUNITIES WANTED

**Manufacturers Representative, Michigan, northern Ohio,** commission sales organization wants to sell chemical and plastic raw materials. All replies confidential and promptly answered. Wire or write: Box 3703 Detroit 15, Mich.

**Dynamic, reliable Swiss M.A. introduced, sales-experienced, technical understanding, languages,** seeks manufacturer-representation for chemicals (inorganic, carbo/pefro-basis/derivates, metalurg.) for Europe (common-market and Switzerland, Austria, Scandinavia). Prepared take over-establishing-work for production-plant in common-market area; Swiss office for execution, financial part at disposal. Discretion. Box OFA 1253 F, Orell Fussie-Annonces, Zurich (Switzerland).

## CONTRACT WORK WANTED

**Air Milling—extremely fine particle size in the low micron range.** Can handle heat sensitive materials. Experienced personnel-lab control. Storage and drop shipments arranged. Excellent transportation for domestic or export. Central Chemical Corporation, Processing Department, Box 310, Hagerstown, Maryland. REgent 3.4700.

**Custom Grinding—Ultra Fine or Course-Specialty or Volume Blending and Grinding service on unit or contract basis.** Complete CO<sub>2</sub> installation for Nylon, Teflon and Heat Sensitive Materials. A Cramer Corp., 10881 S. Central Avenue, Box 682 Oak Lawn, Illinois.

## BUSINESS OPPORTUNITIES

**Lawn growth inhibitor. Promising lead. Independent development laboratory** seeks contract with chemical manufacturer desiring this type product. Best fitted to company with position in nitrogen chemistry, or compounder. Project to start February 1. Assume 2-year term; \$16,000 per annum. BO-2683, Chemical Week.

**Established Spanish agency seeks to represent metal and chemical firms** interested in Spanish market. References. Communicate with Bridgeport Testing Laboratory, 14 Willow St., Bridgeport 10, Conn.

## FOR SALE

**\$3,000,000 Liquidation—Chemical Plant at Orange, Texas.** Type 316 Stainless Steel Tanks, Kettles, Heat Exchangers, Columns, Stills, Crystallizers, Centrifugals, Pumps, Valves, etc. Wonderful Values. Send for list. Perry Equipment Corp., 1415 N. 6th St., Philadelphia 22, Pa.

**For Sale: Unused Buflavak Single Drum Vacuum Dryer, 5' dia. x 12' long, in w/c, never installed.** Cost new over \$40,000 Will Sacrifice at \$15,000 FOB. FS-2533, Chemical Week.

**7'66" x 100' Long Dryer or Kiln, 1/2" shell.** Very good condition. Must be moved. Very low price. Perry, 1415 N. 6th St., Phila. 22, Pa.

**Niagara #510-28 Vertical Pressure Leaf Filter.** T316 Stainless. 510 sq. ft. Excellent. Perry, 1415 N. 6th St., Philadelphia 22, Pa.

## CHEMICALS WANTED

**Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids Plasticizers, Resins, Dyes, Solvents Pigments Etc.** Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HANover 2-6970.

## WANTED

**Wanted: Good, used 55 gallon stainless drums.** W-2619, Chemical Week.

## OPPORTUNITIES

business; personal or personnel; financial; equipment; etc., may be offered or located through the classified advertising section of **CHEMICAL WEEK**. For more information, write to: **CLASSIFIED ADVERTISING DIVISION** P.O. Box 12 New York 36, New York.

strike clause were turned down by the company.

**Secondary Boycott Charges:** The three-month-old strike at American Oil Co.'s Texas City, Tex., plant has resulted in secondary-boycott charges being leveled against Local 2-227, Oil, Chemical & Atomic Workers. Hess Terminal Corp. accuses the local of violating the federal secondary boycott law.

According to a Hess spokesman, pickets took their posts outside the entrance to the terminal a few hours after American Oil Co.'s tanker *Amoco Florida* moored at the terminal to take on gasoline and fuel oil for East Coast ports. None of the 50 Local 2-227 members who work at the terminal would cross the line to load the tanker.

National Labor Relations Board Regional Director Cliff Potter said formal charges against the union had been drawn up, ready for signing, pending the outcome of a union-company conference.

## KEY CHANGES

**W. R. G. Baker** to chairman of the executive committee of the board of directors, Gulton Industries, Inc. (Metuchen, N.J.).

**M. C. Gautsch** to manager, General Manufacturing Dept., Metal & Thermit Corp. (New York).

**David G. Braithwaite** to executive vice-president in charge of manufacturing, research and development, Nalco Chemical Co. (Chicago).

**John A. Cawley** to president, **Edwin F. Roberts** to executive vice-president, Ives-Cameron Co., division of American Home Products Corp. (New York).

**Chester E. Poetsch** to research director, Vick Divisions, Vick Chemical Co. (New York).

**Donald K. Ballman** and **C. B. Branch** to vice-presidents, **Robert B. Bennett** to treasurer, **Fred H. Brown** to controller, **Carl A. Gerstacker** to finance committee chairman, **John Van Stürum** to assistant treasurer, all of Dow Chemical Co. (Midland, Mich.).

## DIED

**George H. Gehrmann**, 68, former medical director, Du Pont Co., at Fairville, Pa.

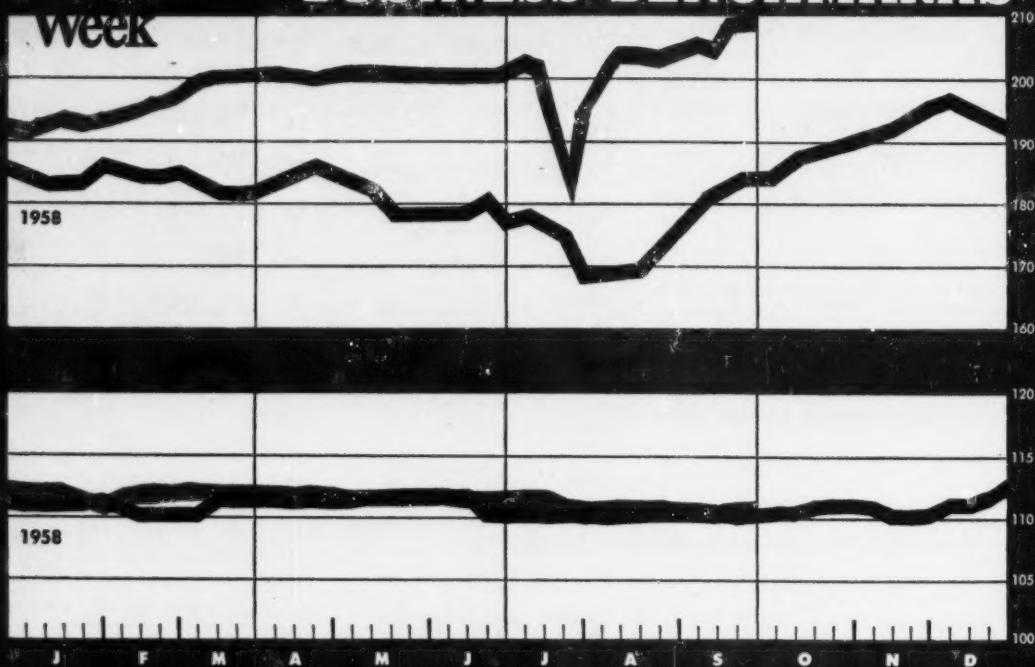
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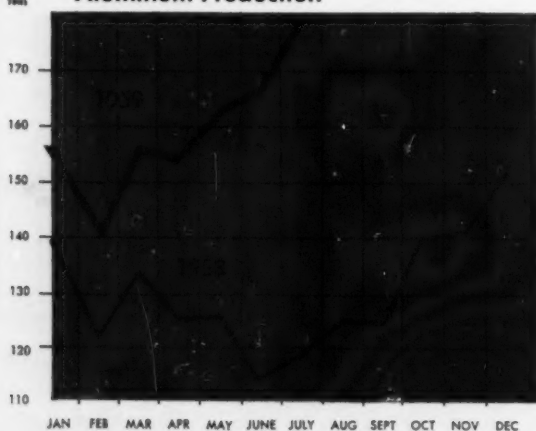
	<i>Latest Week</i>	<i>Preceding Week</i>	<i>Year Ago</i>
Chemical Week output index (1947-49=100)	211.3	210.0	186.0
Chemical Week wholesale price index (1947=100)	110.9	110.9	110.6
Stock price index (12 firms, Standard & Poor's)	55.90	57.32	45.47
Steel ingot output (thousand tons)	345	327	1,771
Electric power (million kilowatt-hours)	13,109	13,759	12,248
Crude oil and condensate (daily av., thousand bbls.)	6,813	6,785	7,009

## FOREIGN TRADE (million dollars)

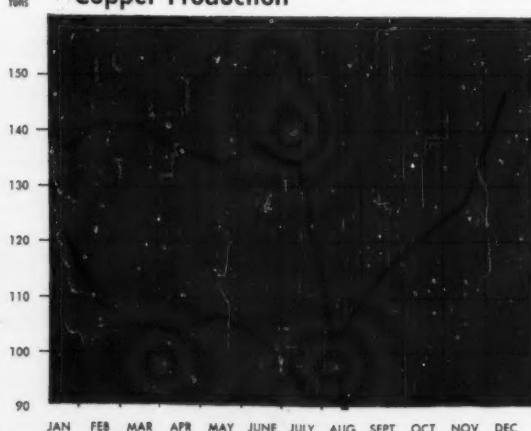
	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>	<i>Latest Month</i>	<i>Preceding Month</i>	<i>Year Ago</i>
Chemicals, total	\$122.9	\$121.2	\$109.2	\$27.8	\$29.2	\$19.6
Coal-tar products	7.8	7.5	9.7	3.5	6.9	6.0
Industrial chemicals	19.3	20.6	17.5	9.4	10.3	6.0
Medicinals and pharmaceuticals	26.1	21.6	20.5	1.8	1.7	1.3
Fertilizers and materials	8.8	8.2	10.3	6.1	7.6	4.3
Vegetable oils and fat (inedible)	14.2	3.0	2.1	7.7	7.0	8.2

## CHEMICAL CUSTOMERS CLOSE-UP

Thousand tons **Aluminum Production**



Thousand tons **Copper Production**



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RAPIDLY PRODUCES STABLE CHELATES

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## White carton makes a beautiful picture

The natural color and texture of luscious fruit contrast strikingly with the bright white background of corrugated kraft. So do product, company identification, and brand name when carried as part of this "new look."

That's why the shipping carton is becoming more than just a container to carry the goods to market. In sparkling white, it attracts attention in shipment—and at the end of the line where sales are made.

It takes proper increase of TITANOX® white titanium dioxide pigment in coatings and liners to obliterate drab-

ness and truly present the new look that affords sharp contrast for merchandising messages.

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